22376

ARCHIVES

OF

OPHTHALMOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP
OF NEW YORK

AND

DR. C. SCHWEIGGER
OF BERLIN

IN CONJUNCTION WITH

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VOLUME XII.

NEW YORK

G. P. PUTNAM'S SONS, 27 & 29 WEST 23D STREET

LONDON: 25 HENRIETTA STREET, COVENT GARDEN

WIESBADEN: J. F. BERGMANN'S Verlag

PARIS: J. B. BAILLIÈRE, 19 Rue Hautefeuille

1883

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1883

Press of
G. P. Putnam's Sons
New York

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VOL. XII. No. 1.

ARCHIVES OF OPHTHALMOLOGY.

REFRACTION IN THE PRINCIPAL MERIDIANS OF A TRIAXIAL ELLIPSOID, WITH REMARKS ON THE CORRECTION OF ASTIGMATISM BY CYLINDRICAL GLASSES; AND AN HISTORICAL NOTE ON CORNEAL ASTIGMATISM.

By SWAN M. BURNETT, M.D., of Washington.

WITH A COMMUNICATION ON THE MONOCHROMATIC ABERRATION OF THE HUMAN EYE IN APHAKIA.

By Prof. WM. HARKNESS,

U. S. NAVAL OBSERVATORY, WASHINGTON.

IN considering refraction in the principal meridians of an ellipsoid with three unequal axes, as we have it in regular corneal astigmatism, all the writers with whom I am familiar—including Helmholtz, Knapp, Donders, Aubert, Fick, and Mauthner—have tacitly assumed that the refraction in these two meridians was free from monochromatic aberration.

It seemed to me, however, that as these meridians have radii which, from the nature of the curved surface, change their length at each successive point, we must have a refraction differing in some respects from the spherical.

As the matter is one very easily and simply settled by construction, I have endeavored to determine the character of such aberration.

We have, of course, from a purely optical point of view, two cases to deal with: one in which the light falls on the sharper end of the ellipsoid, or in the direction of the long axis; and one in which the light falls on the flatter end, or in the direction of the short axis.

The laws for determining the course of any ray of light, after its refraction by a curved surface, are very simple. We have only to know the index of refraction of the refracting medium, and the angle the incident ray makes with the normal to the surface at the point of incidence; the law of sines then gives us at once the direction of the refracted ray.

In the case of the circle, or a section of it, we find the normal by drawing a line from the centre, through the point of incidence, in other words, by prolonging the radius. In the case of an ellipse, however, we can not get the normal in so simple a manner, but there is a well-known theorem,[1] which enables us to do it quite readily. According to this theorem, *all circles and ellipses, whose diameters and major axes correspond, have the same subtangents.* We have constructed fig. 1, which represents the sharper end of the

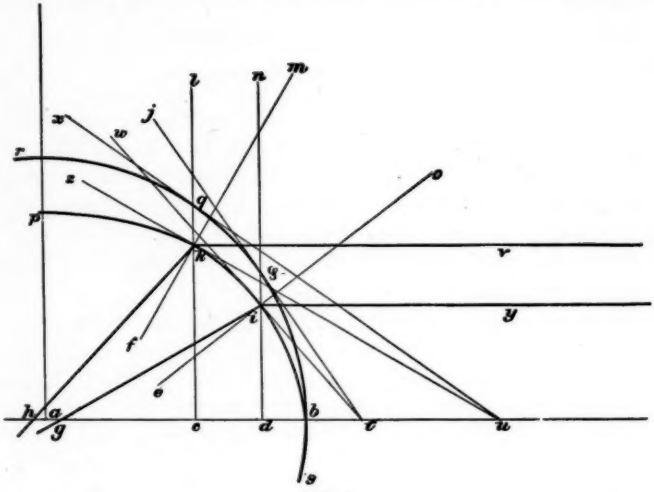


FIG. I.

ellipse—that is, one of the principal meridians of the ellipsoid,

[1] To be found in any treatise on analytical geometry. Compare Loomis' "Elements of Analytical Geometry," 1873: page 113. "Since the subtangent is independent of the minor axis, it is the same for all ellipses which have the same major axis; and since the circle on the major axis may be considered as one of these ellipses, the subtangent is the same for an ellipse and its circumscribing circle."

—in accordance with this theorem. Let *ab* represent the major axis of the ellipse of which *bp* is a portion; from *a* as a centre and *ab* as a radius, draw the segment *rs* of a circle. Let *v* and *y* be the rays parallel to the axis and incident at *k* and *i*. Through the points *k* and *i*, draw *lc* and *nd* perpendicular to *ab*. These will cut the circle at *q* and *φ*, and the normals at these points coincide with lines drawn through them and the centre *a*; and the lines *xu* and *jt* drawn at right angles to these normals, will be the tangents at the points *q*, *φ*. Now, if the circle and ellipse have the same subtangents *bu* and *bt*, then the lines *zu* and *wt*, drawn through *u* and *k* and *t* and *i* must be the tangents to the ellipse at the points *k* and *i*, and the lines *mf* and *oe*, drawn perpendicular to them, must be normals to the surface at the points of incidence, *k* and *i*. We have now all the requisite data, and have only to apply the law of sines in order to find the course of the rays *ig* and *kh*. In this case, in order to have the diagram fall within reasonable limits, we have assumed a refractive index = 3.

It will be seen at a glance that in the case where the rays fall parallel to the long axis of the ellipse, the ray *iy*, nearer the axis, crosses the principal axis, *au*, after refraction, *in front* of the more peripheral ray *kv*,—that is to say, *we have an aberration the opposite in kind to that of an ordinary spherical surface.*

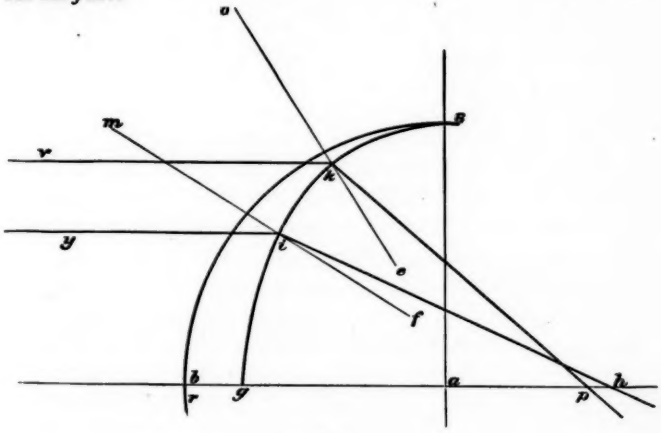


FIG. 2.

If, however, the light falls on the ellipse in the direction of the short axis, or on the blunter end, as we have it represented in fig. 2 (which has been constructed according to the same plan as fig. 1), we find that the more peripherally refracted ray *kp* crosses the principal axis in front of the more centrally refracted ray *ih;* in other words, we have an *excess of the ordinary spherical aberration.*

It therefore becomes evident, *that if we take a series of curves passing over from the flatter to the sharper end of an ellipse, we will have in the refraction, first, an exaggeration of the spherical aberration—which will be greater in proportion to the difference in the length of the major and minor axes —diminishing until the curve becomes a circle, when there will be only the ordinary amount of spherical aberration; then, as the minor axis becomes shorter, this aberration will still further diminish until it becomes for any chosen rays practically zero. As the minor axis still further shortens, the aberration passes over to an opposite kind, and the more central rays cross the principal axis in front of the more peripheral, and this will increase* PARI PASSU *with the shortening of the minor axis.*

In applying these principles to the eye, some interesting facts in regard to the retinal images of astigmatics and the influence of cylindrical lenses on this anomaly are made manifest.

In the first place, it is evident that a deviation of the cornea from the spherical form need not necessarily be injurious to distinctness of the retinal image. On the contrary, should it assume the form of the sharper end of an ellipsoid of revolution and the major and minor axes bear a certain ratio to each other, the monochromatic aberration would be practically abolished, a circumstance which would add much to the sharpness of the retinal image. Of how far this is true of the actual cornea, Prof. Harkness will speak in his communication.

If, however, this ratio between the major and minor axes is varied from in either direction, a monochromatic aberration is at once manifest, and for the relief of such an aberration (we are supposing now that the ellipsoid is one of revolution, and all the meridians are alike) no ordinary

cylindrical or spherical glass can be of any benefit. It is possible that some cases of amblyopia which are benefited but little or not at all by either spherical or cylindrical glasses, and where the nervous apparatus seems intact, fall in this category. We look upon some forms of conical cornea as exaggerated examples of this condition.

Where the cornea, as it usually does, represents a triaxial ellipsoid, we will have a different set of conditions according to the character of the curvature; and the action of cylindrical lenses on the refraction in the principal meridians will not be uniform in all cases.

Let us take, as an example, that form in which the cornea represents the sharper end of an ellipsoid with three unequal axes. It is plain from what has gone before, that the meridian of greater curvature, after it has passed a certain point, will suffer from the greater aberration. *A* in fig. 3 represents the meridian of less, and *B* the meridian of greater curvature. In *A*, the peripheral ray *d* crosses the principal

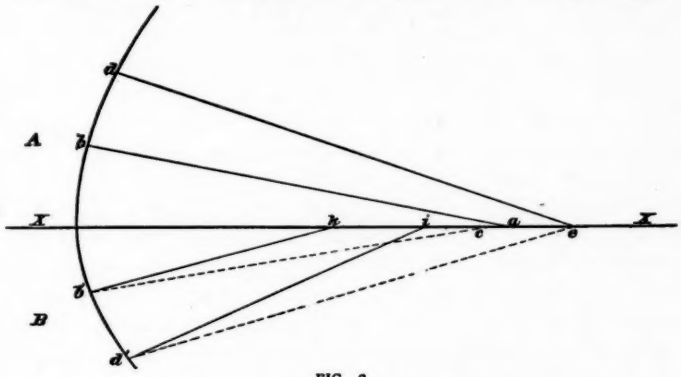


FIG. 3.

axis xx' at *e* and the more central ray *b* at *a*, while in *B* the ray *d'* crosses at *i*, and *b'* at *k*. If now we place a cylindrical lens before the refracting surface with its curvature corresponding to the meridian *B*, and of such strength that the peripheral ray *d'* is carried back and made to cross the axis in the same point *e* as the peripheral ray *d* of the meridian *A*, the relation between *k* and *i*, though they are carried

back from their orignal position, remains unaltered at *c* and *e*, since the regular refraction of the cylinder does not counteract the aberration of the elliptical surface. The result would be that the rays crossing at *a* and *c*, would form figures of diffusion on the focal plane passing through *e*.

If we bring the more peripheral rays, *d* and *d'*, of the two meridians, *A* and *B*, to cross at the same point *c*, moving them forward from *a*, *i*, as in fig. 4, we have the same condition; for the central rays *b*, *b'*, which cross the axis at *o* and *k*, would form figures of diffusion on the focal plane passing through *c*.

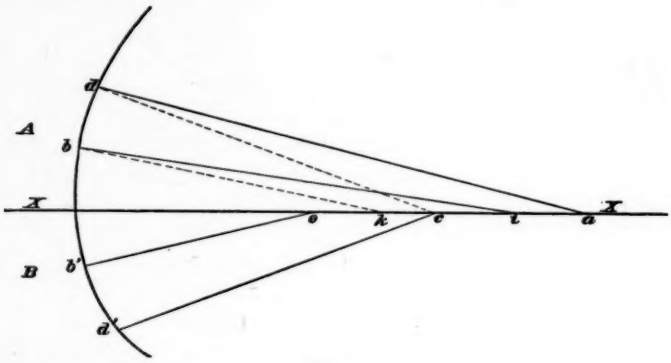


FIG. 4.

We would have, of course, an analogous state of affairs in dealing with the blunter end of the ellipsoid; for while it would be possible, by means of a cylindrical lens, to bring corresponding peripheral or central rays to cross the axis at the same point, it would not be possible to bring *both* the central and peripheral rays to cross it in one point; and if we should have to deal with a surface in which one meridian represented the blunter end of an ellipse, while the other represented the sharper end, the diffusion figures would be still more confusing. Fig. 5 represents such a surface where the peripheral rays, *d*, *d'*, are brought, by means of a cylinder, to cross the axis at the same point *e*.

The more central ray *b* of the flatter ellipse *A*, will cross the axis at *c*, *behind* the focal plane, passing through *e*, while

the more central ray b' of the sharper ellipse B, will cross it *in front* at a, thus forming two sets of diffusion figures.

Under any of these forms, which the cornea may assume,[1]

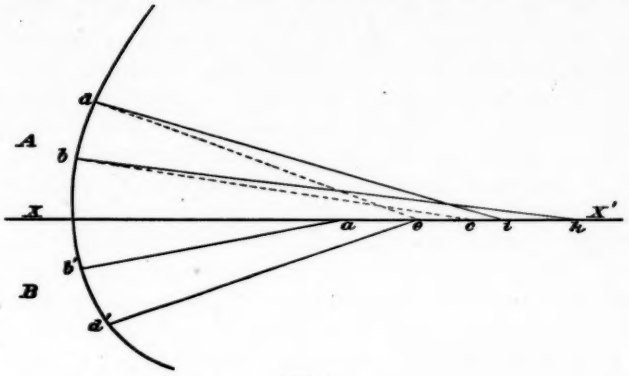


FIG. 5.

the retinal image must have its distinctness of outline impaired by the circles of diffusion which fall on it.[2] This diffusion being greater in the higher than in the lower forms of astigmatism, we should expect to find the visual acuteness, after all possible correction, less in the former, and such I believe is the experience of all practitioners. We should also expect that the vision of astigmatics, after correction, would be less than that of myopes and hypermetropes of the same grade after their neutralization by spherical lenses.

As a matter of statistics, I find that out of about 2,000 astigmatic eyes of all degrees, only about $\frac{1}{10}$ have $V = 1$, after the best possible correction.

It must also be apparent that this aberration in the principal meridians will be greater the greater the angular aperture—which in the eye would be represented by the pupil,—and consequently the larger the pupil the larger the

[1] In all the measurements that have been made up to the present time, the cornea has never been found to assume in either of its meridians the form of the blunter end of an ellipse; but we see no reason to doubt the *possibility* of such an occurrence.

[2] We do not take into consideration here the rays passing through the intermediate meridians. These require a separate investigation.

figures of diffusion, and the more indistinct the image. It is for this reason, among others, that in examining for the presence, and particularly the degree of astigmatism, I always abstain, except on rare occasions, when I have the strongest reasons to suspect the presence of spasm of accommodation, from dilating the pupil. I know it has become the fashion, which has quite a large following, to paralyze the accommodation (and at the same time, of course, dilate the pupil) in the examination of almost every case of refractive anomaly, and especially where astigmatism is suspected. One principal argument against this is, that when the eye is under the influence of a mydriatic, it is not in its normal condition, and glasses fitted to such an eye may not, and as a matter of my experience usually do not, at all suit it when the effects of the mydriatic have passed away. To say nothing of the sources of error due to the enlarged pupil, there is a greater or less amount of tension of the ciliary muscle, normal to every eye, which disappears under the mydriatic, and gives the eye a refraction below that which it will have when it returns to its natural state.

Furthermore, I think, judging from my own experience, that spasm of accommodation is not common in astigmatism; because, except in the compound hypermetropic form, no benefit can accrue from such spasm.[1] It would be impossible for any amount of contraction of the ciliary muscle in its totality to overcome the difference in the refraction in the two meridians so as to give clear and distinct vision. If, however, a mydriatic is used, it is always wise to wait until the pupil has regained its normal size before the final glasses are ordered.

It will be remembered that there is one form of ellipse which is practically free from aberration, and it would be interesting to know how far the cornea of the emmetropic eye deviates from this form. The investigation of this question would lead into mathematical computations far beyond my skill. So I laid the subject before my friend, Dr. Wm.

[1] Except in the *partial* form spoken of by Dobrowolski and Javal; but of this we will speak at another time.

Harkness, Professor of Mathematics, U. S. N., to whose profound knowledge of optics I am already so much indebted. The results of his calculations are herewith subjoined.

ON THE MONOCHROMATIC ABERRATION OF THE HUMAN EYE IN APHAKIA.

A Letter to Dr. Swan M. Burnett by Wm. Harkness.

Some months ago you pointed out to me the want of exact knowledge among oculists respecting certain optical properties of the cornea of the human eye, and at your request I willingly undertook to investigate them. For that purpose you placed in my hands two works whose titles are as follow:

1. Vorlesungen über die optischen Fehler des Auges. Von Prof. Dr. Ludwig Mauthner, in Innsbruck. Wien, 1876.

2. On the Anomalies of Accommodation and Refraction of the Eye. By F. C. Donders, M.D., Sydenham Society, London, 1864.

For the sake of brevity these works will be designated respectively as Mauthner and Donders.

The cornea of the emmetropic eye seems to have an ellipsoidal form, but the existing data for determining its curvature in the vertical meridian are too meagre to give a satisfactory result. I have therefore confined my attention to the horizontal meridian, and have taken the data for it from table VII, upon pages 598–599 of Mauthner. That table exhibits the form and dimensions of the cornea in seventeen pairs of emmetropic eyes, and from the mean of these thirty-four eyes, it appears that in the visual axis the radius of curvature is 7.708 millimetres, while 20° to the inner side of that axis it is 8.378 millimetres, and 20° to the outer side 7.884 millimetres. Mauthner does not explain the phrase "20° to the inner (or outer) side of the visual axis," and I have had some trouble in ascertaining its true meaning.

It is customary to regard the outline of the cornea, along a horizontal section through the visual axis, as part of an ellipse. Let it be part of the ellipse NAMB, figure 6, of

which the major and minor semi-axes are respectively AH and BH; and let C, D, E, be the points at which the radii

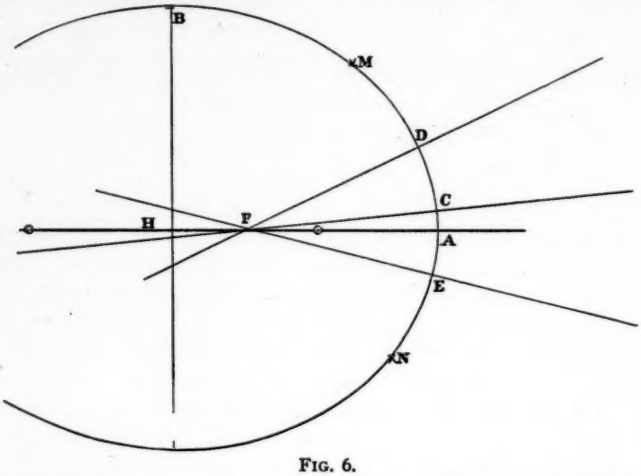


FIG. 6.

of curvature, r, r_1, r_2, are measured. DF, CF, and EF are normals to the ellipse at these points, and CF is the visual axis. By the phrase "20° to the inner side of the visual axis" Mauthner means that the angle CFD, between the visual axis and the normal at D, is 20°; and similarly, by "20° to the outer side of the visual axis" he means that the angle CFE is 20°. It may be well to remark that figure 6 is accurately drawn to scale, and the arc NAM represents that portion of the ellipse which is included within the limits of the cornea.

Let a represent the semi-major axis, AH; b the semi-minor axis, BH; φ the angle CFD = CFE; α the angle AFC, included between the major axis of the ellipse and the visual axis; r the radius of curvature in the visual axis; and r_1 and r_2 the radii of curvature at a distance of φ degrees on each side of the visual axis, r_1 being greater than r_2. Then, on pages 19 and 20 of an article entitled "Ueber die Accommodation des Auges," published in the *Archiv für Ophthalmologie*, Erster Band, Abtheilung 2, Helmholtz has shown that

$$\tan 2\alpha = \tan \varphi \frac{(rr_2)^{\frac{1}{2}} - (rr_1)^{\frac{1}{2}}}{(rr_1)^{\frac{1}{2}} + (rr_2)^{\frac{1}{2}} - 2(r_1 r_2)^{\frac{1}{2}}} \qquad (1)$$

$$\varepsilon^2 = \frac{r_1^{\frac{1}{2}} - r^{\frac{1}{2}}}{r_1^{\frac{1}{2}} \sin^2(\alpha + \varphi) - r^{\frac{1}{2}} \sin^2 \alpha} \qquad (2)$$

$$a = \frac{r(1 - \varepsilon^2 \sin^2 \alpha)^{\frac{1}{2}}}{1 - \varepsilon^2} \qquad (3)$$

$$b = a(1 - \varepsilon^2)^{\frac{1}{2}} \qquad (4)$$

Substituting in these formulæ the radii of curvature given above, namely, $r = 7.708$ millimetres, $r_1 = 8.378$ millimetres, $r_2 = 7.884$ millimetres, we find for the normal cornea

$\alpha = 5^\circ\ 49'\ 52''$ $\qquad$ $a = 10.9625$ millimetres.
$\varepsilon^2 = 0.300135$ $\qquad$ $b = 9.1711$ "

We have next to consider how a system of parallel rays falling upon such a cornea, parallel to the visual axis, will be refracted; and as our object is to determine the errors of refraction produced by the cornea alone, we must conceive the lens to be absent. On account of the thinness of

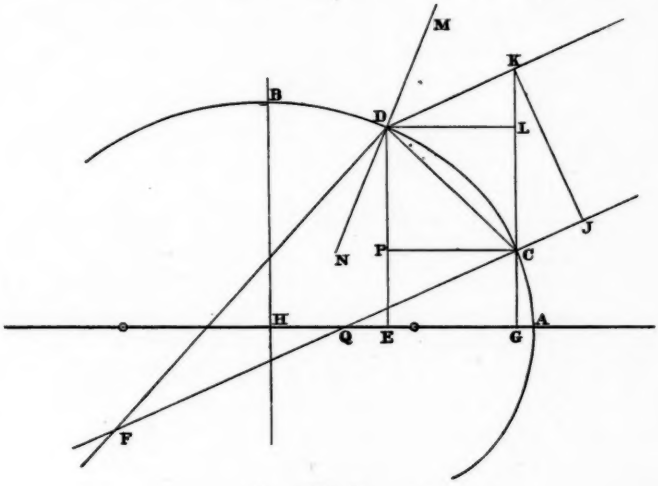


FIG. 7.

the cornea, the almost perfect parallelism of its surfaces, and the exceedingly slight difference in refractive power between it and the aqueous and vitreous humors, no sensible error will result if we regard the whole eye as a homogeneous solid, having the refractive index of the aqueous humor, and the same bounding surface as the cornea.

In fig. 7, let ACDB be one quarter of an ellipse, a portion of which forms the bounding surface of the cornea; AH being its semi-major, and BH its semi-minor, axis. Also let JCF be the visual axis, and KD a ray parallel to it, entering the cornea at the point D. The co-ordinates of the point C, at which the visual axis pierces the cornea, are HG and GC; and the co-ordinates of the point D are HE and ED. To find expressions for these co-ordinates, we assume the equation of an ellipse referred to its centre and axes, which is

$$0 = a^2y^2 + b^2x^2 - a^2b^2 \qquad (5)$$

and in this we put

$$x = a \cos \psi \qquad (6)$$

$$y = b \sin \psi \qquad (7)$$

Differentiating (5), and substituting the values of x and y from (6) and (7)

$$\frac{dy}{dx} = -\frac{b}{a} \cot \psi \qquad (8)$$

As CF is normal to the ellipse, it is evident that at the point C

$$\frac{dy}{dx} = \tan (90^\circ - \alpha) = \cot \alpha. \qquad (9)$$

Equating the right-hand members of (8) and (9)

$$\cot \psi = a \cot \alpha \div b \qquad (10)$$

This gives ψ for the point C, and the corresponding values of x and y, which will be designated x_0 and y_0, are found from (6) and (7). Let D, fig. 7, be any other point in the curve. To find its co-ordinates, produce GC to K, draw DL parallel to AH, and let KJ = d. Then

$$ED = GC + CK - KL. \qquad (11)$$

But $ED = y$, $GC = y_0$, $CK = d \sec \alpha$, $-KL = (x - x_0) \sin \alpha$, and therefore

$$y = y_0 + d \sec \alpha + (x - x_0) \sin \alpha \qquad (12)$$

When y is known (7), gives

$$\sin \psi = y \div b \qquad (13)$$

and then x follows from (6). As y can not be accurately found until x is known, we begin by assuming

$$y = y_0 + d \sec \alpha \qquad (14)$$

and having computed the corresponding value of x, a corrected value of y is obtained from (12). This, in its turn, gives a corrected value of x; and by two or three successive approximations, both y and x become known with the utmost exactness.

Putting $MDL = \beta$, it is evident that because MN is a normal to the ellipse

$$\frac{dy}{dx} = \cot \beta \qquad (15)$$

and then, by (8)

$$\cot \beta = - b \cot \psi \div a \qquad (16)$$

in which β must be regarded as having the same sign as the y, from which it is derived through (13).

The angle of incidence of the ray KD upon the cornea is MDK, which is equal to $MDL - KDL$. But $KDL = CQA = \alpha$, and putting $MDK = \iota$, we have

$$\iota = \beta - \alpha \qquad (17)$$

After refraction at the cornea, let the path of the ray KD be DF. Then FDN is the angle of refraction, which we will designate as ι', and if μ is the refractive index of the eye then, by a well-known optical law,

$$\sin \iota' = \sin \iota \div \mu \qquad (18)$$

Designating the angle CDE by γ, and the distance CD by D, we have

$$\tan \gamma = \frac{x - x_0}{y - y_0} \qquad (19)$$

$$D = \frac{y - y_0}{\cos \gamma} \qquad (20)$$

From the figure

$$\angle \mathrm{CDF} = \mathrm{CDE} + \mathrm{EDN} + \mathrm{NDF} \qquad (21)$$

But $\mathrm{CDE} = -\gamma$, $\mathrm{EDN} = 90^\circ \sim \beta$, $\mathrm{NDF} = \imath'$, and therefore

$$\angle \mathrm{CDF} = (90^\circ \sim \beta) + \imath' - \gamma \qquad (22)$$

The expression $(90^\circ \sim \beta)$ is used to indicate the excess of 90° over the numerical value of β; the latter quantity being taken without regard to sign. For that portion of the cornea which lies between A and C, the complement of the angle CDF must be employed instead of the angle itself.

Again, from the figure

$$\angle \mathrm{CFD} = \mathrm{MDK} - \mathrm{FDN} = \imath - \imath' \qquad (23)$$

Finally, if F is the point where the ray KD intersects the visual axis, then CF will be the focal distance of the cornea for parallel rays. Representing this distance by F, we have from the triangle CDF

$$F = \frac{y - y_0}{\cos \gamma} \times \frac{\sin [(90^\circ \sim \beta) + \imath' - \gamma]}{\sin [\imath - \imath']} \qquad (24)$$

It yet remains to translate these algebraic formulæ into numbers. We have already obtained the values of a, b, and α for a normal eye, and by substituting them in (10), (7), and (6), we find, for the point where the visual axis enters the cornea,

$$y_0 = 0.78071^{\mathrm{mm.}} \quad x_0 = 10.9227^{\mathrm{mm.}}$$

The monochromatic aberration of the cornea is most

conveniently investigated by tracing the paths which a considerable number of parallel rays impinging upon it will pursue within the eye. Eleven such rays have been considered, all situated in the same horizontal plane, at intervals of half a millimetre from each other, and the central one coinciding with the visual axis. For their passage a pupil five millimetres in diameter is necessary. The eleven rays in question furnish eleven values of d, varying by intervals of half a millimetre from $+ 2.5^{mm.}$ to $- 2.5^{mm.}$, from which, by means of formulæ (12), (13), (6), (16), (17), (18), (19), and (24), the corresponding values of F have been computed. With respect to (18), it should be remarked that for reasons already stated, the cornea, the aqueous humor, and the vitreous humor have been regarded as a homogeneous mass for which $\mu = 1.3366$. This is Sir David Brewster's value for the aqueous humor. The value of F for the ray situated in the visual axis has been obtained from the well-known expression.

$$F = \frac{\mu r}{\mu - 1} \qquad (25)$$

TABLE I.

KJ.	DE.	HE.	∠MDL.	∠MDK.	∠NDF.
mm.	mm.	mm.			
+2.5	+3.2265	10.2617	+24° 11′ 32″	+18° 21′ 40″	+13° 37′ 54″
2.0	2.7441	.4603	20 32 51	14 42 59	10 57 23
1.5	2.2583	.6250	16 53 36	11 03 44	8 15 13
1.0	1.7691	.7366	13 13 28	7 23 36	5 31 26
+0.5	1.2765	.8558	9 32 14	+ 3 42 22	+ 2 46 19
0.0	0.7807	.9227	5 49 52	0 00 00	0 00 00
−0.5	+ .2817	.9574	+ 2 06 14	− 3 43 38	− 2 47 16
1.0	− .2208	.9593	− 1 38 56	7 28 48	5 35 21
1.5	0.7266	.9280	5 25 37	11 15 29	8 23 56
2.0	1.2359	.8625	9 14 01	15 03 53	11 12 46
−2.5	−1.7487	10.7614	−13 04 17	−18 54 09	−14 01 37

KJ.	∠EDC.	Log. CD.	∠CDF.	∠CFD.	CF.	CF.
mm.					mm.	mm.
+2.5	−15° 07′ 24″	0.40373	+94° 33′ 46″	4° 43′ 46″	30.630	30.632
2.0	13 15 08	.30473	93 39 40	3 45 36	.697	.697
1.5	11 23 28	.17820	92 45 05	2 48 31	.727	.728
1.0	9 32 22	0.00098	91 50 23	1 52 07	.721	.723
+0.5	− 7 41 05	9.69923	+90 55 10	0 56 03	.682	.684
0.0	.....	.....	.....	0 00 00	.608	.610
−0.5	− 3 58 41	9.69915	−90 54 49	0 56 22	.504	.502
1.0	2 05 33	0.00094	91 50 50	1 53 27	.357	.359
1.5	− 0 12 05	.17820	92 46 14	2 51 33	30.183	30.182
2.0	+ 1 42 36	.30481	93 41 21	3 51 07	29.970	29.971
−2.5	+ 3 38 56	0.40390	−94 36 16	4 52 32	29.725	29.724

Table I gives for each value of d, the resulting value of F, together with the most important quantities occurring in its computation.

The quantities contained in the various columns are indicated by the letters at their heads, which refer to figure 7. For example, the heading of the first column is KJ, which indicates that the quantities contained in it are the lengths of the line KJ, figure 7. For convenience of reference, the symbols by which these quantities are designated in the formulæ are here recapitulated:

$KJ = d$	Angle $MDL = \beta$
$DE = y$	" $MDK = \iota$
$HE = x$	" $NDF = \iota'$
$CD = (y - y_0) \div \cos \gamma$	" $EDC = \gamma$
$CF = F$	" $CDF = (90 \sim \beta) + \iota' - \gamma$
	" $CFD = \iota - \iota'$

The results contained in the first of the two columns headed CF are exhibited graphically in figure 8, the values of F being taken as abscisses, and the corresponding values of d as ordinates, and it is evident that the focal curve is a

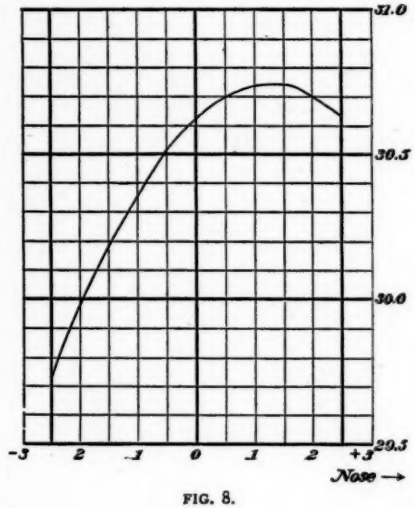


FIG. 8.

parabola. To find an expression for it, we put

$$F = C - m\,(d - n)^2 \qquad (26)$$

developing and rearranging the terms

$$F = (C - mn^2) - md^2 + (2mn)d \qquad (27)$$

When d vanishes (27), reduces to

$$F = (C - mn^2) \qquad (28)$$

and by comparing this with the numbers in the first of the two columns headed CF we see that

$$C - mn^2 = 30.608^{\text{mm.}}$$

Substituting this in (27), and comparing the resulting equation with the values of F for $d = +2.5^{\text{mm.}}$ and $d = -2.5^{\text{mm.}}$, we obtain

$$0 = -0.022 - 6.25m + 5mn$$
$$0 = +0.883 - 6.25m - 5mn$$

whence

$$m = +0.0689 \qquad 2mn = +0.181$$
$$n = +1.314 \qquad mn^2 = +0.119$$
$$C = +30.727$$

Substituting these values in (26) and (27), we have for a first approximation

$$F = 30.727 - 0.0689\,(d - 1.314)^2$$
$$= 30.608 - 0.0689\,d^2 + 0.181\,d$$

A comparison of the values given by these expressions with those contained in the table, shows that it will be more accurate to take

$$C - mn^2 = 30.610^{\text{mm.}}$$

Doing so, and combining this with the values of F corresponding to $d = +2.0^{\text{mm.}}$, and $d = -2.0^{\text{mm.}}$, we have finally

$$F = 30.730 - 0.0691\,(d - 1.314)^2$$
$$= 30.610 - 0.0691\,d^2 + 0.1817\,d$$

The values of F computed from these expressions are exhibited in the last column of table I, and the accuracy with which they represent the numbers in the preceding column is apparent.

Table II shows how the monochromatic aberration actually existing in the normal cornea compares with what would have existed if the cornea had been spherical. Upon each line of the table, the first column contains the assumed diameter of the pupil; the second, third and fourth columns relate to the normal cornea, and contain respectively the greatest and least focal distance occurring within the area of the pupil, and the amount of astigmatism corresponding to them; the fifth, sixth, and seventh columns relate to a spherical cornea, and contain similar data for it. In computing the focal distance at various points of a spherical cornea it has been assumed that $r = 7.708^{mm.}$, $\mu = 1.3366$, and the following formulæ have been employed:

$$\sin \imath = d \div r \qquad (29)$$

$$\sin \imath' = \sin \imath \div \mu \qquad (30)$$

$$F = \frac{2\, r \sin \tfrac{1}{2}\, \imath \cos \tfrac{1}{2}\, \imath}{\sin (\imath - \imath')} \qquad (31)$$

As the monochromatic aberration we are considering occurs in a single meridian, its correction by cylindrical lenses is impracticable, but nevertheless its amount may be expressed in the notation usually employed for astigmatism. The requisite formula is

$$\text{Astigmatism} = 0.0396\,(F - F') \qquad (32)$$

In which F and F' are the lengths in millimetres of the greatest and least focal distances found within the area of the pupil, and the result is expressed in terms of the Paris inch.

TABLE II.

d.	Normal Cornea.			Spherical Cornea.		
	F.	F'.	As.	F.	F'.	As.
mm.	mm.	mm.	Par. in.	mm.	mm.	Par. in.
1	30.684	30.502	1:139	30.608	30.556	1:476
2	.723	.359	1: 69	.608	.414	1:130
3	.728	30.182	1: 46	.608	30.171	1: 58
4	.728	29.971	1: 33	.608	29.826	1: 32
5	30.728	29.724	1: 25	30.608	29.376	1: 21

In conclusion, the results at which we have arrived may be summed up as follows:

1. The monochromatic aberration originated by the normal cornea occurs principally on the outer side of the visual axis—that is, on the side farthest from the nose.

2. The diameter of the pupil is usually about four millimetres. For diameters less than this, the monochromatic aberration of a spherical cornea would be less than that of the normal cornea. For greater diameters, the reverse is true. This is contrary to the generally received opinion. (See Donders, foot-note on page 310.)

3. Donders says (pp. 456, 457), the astigmatism in sharp eyes is not generally more than from 1: 140 to 1: 60, and whenever it exceeds the latter amount, the power of vision suffers under some circumstances. An astigmatism of 1: 40 he regards as decidedly abnormal. Nevertheless, with a pupil four millimetres in diameter, the normal cornea produces monochromatic aberration to the extent of 1:33; and as there is no confusion of images in the normal eye, it seems probable that the crystalline lens exerts some compensating action. This suspicion is strengthened by the well-known fact that in aphakia, the acuteness of vision is nearly always improved by giving a certain inclination to the powerful convex glasses which are then necessary. It therefore becomes important to ascertain the true structure and position of the lens. What is the distribution of density in its layers? Are its two halves, situated respectively on the inner and outer sides of the visual axis, of unequal refractive power? Is its form unsymmetrical, or is it unsymmetrically placed with respect to the visual axis? Or is it inclined to that axis? These are difficult questions, but doubtless they can be answered by patient observation.[1]

Washington, Feb., 1883.

[1] Prof. Ludwig Matthiessen, of Rostock, has made some extensive investigations on the optical character and properties of the crystalline lens. Compare his exhaustive paper, "Die Differenzialgleichungen der Dioptrik der geschichteten Krystallinse," in E. Pflüger's *Archiv f. Physiologie*, Bd. xix, pp. 480–562; also a paper by M. Peschel, "Experimentelle Untersuchungen über die Periscopie der Krystallinse," *ib.*, Bd. xx, pp. 338–353.) S. M. B.

AN HISTORICAL NOTE ON CORNEAL ASTIGMATISM.

Senf was the first (in 1846) to make measurements of the cornea, which showed it to be ellipsoidal rather than spherical in shape. Helmholtz arrived at the same conclusion from his ophthalmometrical measurements which were published in *Gräfe's Archives* B. i, Abt. 2 (1855). In this article (p. 18), he says: "The form of the cornea corresponds approximately to an ellipsoid formed by the revolution of an ellipse about its major axis."

He gives these measurements as well as those of Senf in the first part of his "Physiologische Optik" (pages 8 and 11 of the French edition), published in 1856; but it is evident that he still considered the cornea to be an ellipsoid of revolution, as his measurements were confined to one meridian (the horizontal). He speaks at this time (p. 142) of the astigmatism of Young as being caused by the lens, and of the correction of his own astigmatism (of low degree) by means of an obliquely placed concave lens, but no hint is given that the cause of the astigmatism was in the cornea.

It was Knapp who first determined by ophthalmometric means that the cornea was not an ellipsoid of revolution but an ellipsoid with three unequal axes.

In the "Verhandlungen der vom 3–6 Sept., 1859, im Heidelberg versammelten Augen Artze," Berlin, Peters, 1860, we find (p. 19), that "Dr. Knapp gave an account of his measurements on the curved surface of the human eye, made by means of Helmholtz's ophthalmometer. 1. The cornea. Helmholtz's measurements were confined to the horizontal meridian. Knapp, on the other hand, had measured four eyes in many different meridians with the following result: 1. The centre and apex of the cornea do not coincide. . . . The anterior focal distance of the horizontal ellipse=23.095 *mm.*; of the vertical meridian = 23.34 *mm.* The posterior focal distance of the horizontal ellipse = 30.18 *mm.*; of the vertical ellipse = 31.1 *mm.* . . . In the discussion on this division of the subject, Knapp remarked that in all probability it was the difference between the vertical and horizontal ellipses which rendered cylindrical glasses necessary,

and was the cause of the difference in the 'accommodation-line' in the vertical and horizontal directions. After cataract-extraction, in sclerectasia and hyperpresbyopia, such glasses were of benefit, as had been shown by Prof. Donders.

"In regard to the accommodation-line, Prof. Donders remarked, that in his opinion, it was due to the lens, from the fact that it was in intimate connection with polyopia, which was undoubtedly caused by the lens as proven by entopic experiments."

These investigations were published in detail by Knapp in his inaugural thesis, "Die Krümmung der Hornhaut des menschlichen Auges" in 1860.

Donders in his first papers on the refraction and accommodation of the eye, published in *Gräfe's Archives* makes in B. vii (1860), Abt. 1, p. 176, an application of this asymmetry to the explanation of abnormal astigmatism, in contradistinction to the lenticular theory of Young, and gives reference to Knapp's paper. So far as I know this is the first mention made by Donders of corneal astigmatism. In *Gräfe's Archives* B. viii (1862), Abt. 2, appeared Knapp's classical paper "Ueber die Assymmetrie des Auges in seinen verscheidenen Meridianebenen." While this paper was in press, Donders published his "Astigmatisme en cylindrische Glazen," which, for the first time, brought the subject of astigmatism and its correction prominently before the profession. Soon afterward (1864), his treatise on the "Anomalies of the Refraction and Accommodation of the Eye," appeared, which made astigmatism a part of the general knowledge of the profession.

The opinion that regular astigmatism resides in the cornea has been most thoroughly substantiated by all observations made since that time. Javal in the *Annales d' oculistique*, t. 87 (1882), pp. 33–43, says that in the testing and measurement of more than 100 eyes, the total astigmatism corresponded exactly with the corneal astigmatism, with the exception of four cases, and in one of these the difference was only 0.2 D; and still further examinations by him, and by Dr. Nordenson, amounting to more than 250 additional cases, have only confirmed his first observations.

A CASE OF RETINITIS ALBESCENS PUNCTATA.

(*Mooren, Kuhnt.*)

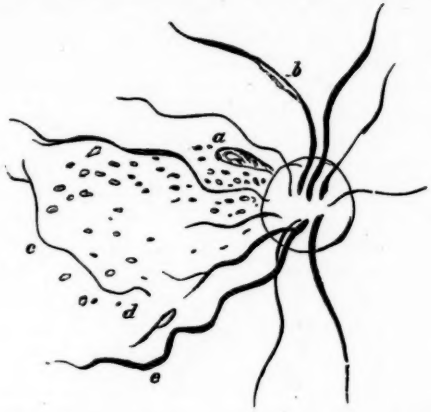
By SWAN M. BURNETT, M.D., Washington.

Mrs. L. A. B., aged fifty-eight, has of late years enjoyed very good health. Formerly, and particularly at the climacteric period, she had serious attacks of epistaxis, but these are now much less frequent and severe.

In June last she suddenly noted a dark spot in the centre of the visual field of the right eye. The scotoma, when projected to the opposite side of the street, was about one yard square, and made it impossible for her to distinguish even large objects at that distance. Her vision remained in this state for more than a month, when the scotoma began to break up, and when I saw her for the first time in December, 1882, there was barely a trace of it, and vision in that eye was the same as that in the other, namely, $=\frac{1}{3}$. On examination, the visual field was found to be intact and color-perception normal, as in the fellow-eye.

An ophthalmoscopic examination showed the media to be perfectly clear, but revealed some peculiar changes in the fundus, which are indicated in the accompanying diagram. In the region of the macula lutea, and occupying the space between this and the optic disk, as well as somewhat below the latter, there were a large number of very small yellowish-white dots, which could easily be overlooked in the indirect method of examination. These dots were not always round in shape, but frequently oblong, and usually had a sharply-defined outline. They were not evenly distributed over the surface, nor were there any isolated areas in which they were thickly studded. No abnormal accumulation of pigment was anywhere visible. The retinal vessels going to the inner side were normal as to their size and course. The vessels going to the other side, however, showed

marked alterations. One of the large veins running downward (*e*) became very tortuous toward the end of its course, while a smaller one just above it became lost, and its place was occupied by a white band (*d*), similar in appearance to the dots, while another (*b*), running from the upper portion of the disk, became at a short distance from its edge a mere thread, to become again



of its normal size or even larger. One small twig (*c*), running quite close up to the macula, was very tortuous, and arose abruptly from the vicinity of the vessel which had been transformed into the white band, no direct connection being found between it and any of the vessels in the neighborhood. One small tortuous vessel ran from the edge of the disk directly across to the upper edge of the macula.

At the upper outer edge of the disk there was a hemorrhagic spot (*a*), extending about $\frac{3}{4}$ of a disk diameter into the retina. It was pear-shaped, and its head had a white centre. There were no other abnormal appearances of the fundus.

Ophthalmological literature contains but five cases which in their general features bear a resemblance to the foregoing. The first mention of such appearances is to be found in Mooren's recently-issued "Fünf Lustren Ophthalmogischer Wirksamkeit," 1882, p. 216, though the author makes note of the fact that Kuhnt had shown him a drawing of similar appearances before his own case was put on record. Kuhnt

has reported his case in full before the Fifty-fifth Congress der Natur-Forscher und Aertze, held in Eisenach—a very brief abstract of which is to be found in *The Ophthalmic Review*, vol. i, No. 14, p. 411.

Besides these two, Hirschberg has reported three others in his *Centralblatt f. Augenheilkunde*, Dec., 1882, p. 330.

Of these cases I subjoin an abstract, in order that we may be able to take a general view of the character of these peculiar alterations.

Mooren's Case (1).—A man, aged thirty. V= $\frac{1}{10}$. VF normal. Media clear. Hundreds of punctiform pale-white dots, which resembled cholesterine crystals, or as if the retina and choroid had been punched through. The relatively narrow retinal vessels were nowhere covered by the specks, but the latter were pretty evenly distributed between the arterial twigs. Disk slightly gray, with all the appearances of a past inflammatory process. In six weeks V=$\frac{1}{3}$, with the condition of the retina remaining the same.

Kuhnt's Case (2).—The patient was a girl with V=$\frac{1}{6}$, and contraction of VF. Minute white specks on the inner retinal layers, and seen only in the erect image. K. reports that he has seen two similar cases since the first one.

Hirschberg's Case (3).—Woman, fifty-nine years of age. Three weeks before had suffered from hæmoptysis. Three days before he saw her she had sudden impairment of V in *R* eye, accompanied with photopsies. There was atheromatous degeneration of the arteries, and palpitation without any valvular trouble. Urine free. V= $\frac{15}{200}$; central scotoma, but VF not contracted. No alteration in disk; but between m.l. and o.d. numerous small, white specks, which had almost a crystalline appearance, and apparently lying on the retina. In nine months these changes had disappeared, and V= that of the fellow-eye.

Hirschberg's Case (4).—A woman, fifty-eight years of age, suffering from catarrh and dilatation of the stomach. Heart and vascular system normal. Urine free. Small scotoma of 3° in centre of *L* VF. V= $\frac{15}{40}$. Retinal hemorrhage above the disk three or four o.d.'s in size, which H. thinks due to vomiting. O.D. normal. V finally became $\frac{15}{30}$, and the changes in the retina retrogressed.

Hirschberg's Case (5).—Woman, sixty-two years of age. An attack of cholera morbus. Suddenly a green scotoma in centre of

field of left eye. V= $\frac{15}{100}$. VF normal; o.d. and vessels also normal. Fine points in the centre of the retina. Urine free.

Six cases do not furnish sufficient data on which to base any reliable opinion as regards either the etiology or essential nature of the affection; but it seems to be evident that there is no derangement of the general system to which it can be referred. In every reported case it was unilateral, and the urine was found to be normal in every instance in which it was examined.

The peculiarities of the affection seem to be that the alterations are confined almost exclusively to the region between the m.l. and o.d., and are in the retina, and most probably confined to the inner layers.

Vascular disturbances are not always present, but in the case reported by me were quite marked; in fact, all the characteristics of a retinitis were more pronounced in this case than in any of the others. The central scotoma, which was noted in three cases, we can attribute to such an interference with the nutrition of the retina in the region of the m.l., as to hinder it in the proper performance of its function. It may occur at any age, and affects both sexes.

The prognosis is, as a rule, good—some cases going on to complete recovery, while none seem to lead to destruction of vision.

MELANOMA OF THE IRIS.

By Prof. ERNST FUCHS, M.D., of Lüttich.

Translated by Isidor Furst, New York.

(*Fig.* 1, *plate vii.*)

THE abnormal accumulations of pigment in the iris show themselves in two forms: either as dark, at times elevated-looking spots (nævi pigmentosi), or as circumscribed small tumors designated as melanomata. The latter sometimes reach relatively considerable dimensions. v. Gräfe [1] has described a case in a girl of fifteen, in whom a blackish-brown oval tumor, measuring one and one and a half lines in its diameters, grew from the pupillary margin of the iris and projected so far into the anterior chamber as to almost touch the posterior corneal wall. From this node a flat tumor seems to have extended along the posterior surface of the iris as far as its ciliary margin, where an oblong, dark stripe appeared. In a case clinically observed by Knapp,[2] likewise not examined anatomically, there were in the iris, in its larger circumference, six nodules, ranging in size from a pin's head to a diameter of five millimetres. The eye in question was otherwise quite normal, only from time to time (every three or four months) slight hemorrhages occurred into the anterior chamber. Inasmuch as Knapp was unable to perceive macroscopically any vessels in the tumors, it remains doubtful whether the hemorrhages originated from them or from dilated vessels of the iris.

In tumors having reached this degree of development,

[1] *Gräfe's Archiv*, Bd. vii, 2, p. 36.

[2] "Intraocular Tumors," German edition, p. 220; English edition, p. 290.

we must of course ask ourselves whether we have not to deal with a malignant new-formation, with a melano-sarcoma. These two kinds of tumor at times bear an extraordinary external resemblance to each other; and, moreover, in some cases melano-sarcomata have really been seen to develop from simple melanomata.[1] The differential diagnosis between these two kinds of tumor, in many cases, can only be made from the anamnesis, or, that failing, from prolonged observation of the patient, so as to determine whether the tumor remains stationary or is growing.

Our anatomical knowledge of melanomata of the iris is very meagre, because tumors which do not form the object of an operation only accidentally come under examination. Knapp has examined anatomically a melanoma of the iris and gives the following description of it[2]: "The tumor consists of a circumscribed, exuberant development of the stroma cells of the iris, the minority of them colorless, the majority pigmented; they are arborescent and anastomosing. They possess no sharp demarcation toward the neighboring tissue, and the other parts of the iris are perfectly normal."

To the best of my knowledge, this is the only and withal very brief anatomical description of a melanoma of the iris. I therefore subjoin the result of the examination of a case observed by me, particularly because its histological composition differs considerably from that found by Knapp.

In December, 1880, a woman aged seventy-five presented herself at Prof. v. Arlt's ophthalmic clinic at Vienna, suffering from asthenopia. The affection was due to an incipient senile cataract. Besides, the following condition was demonstrated at the right eye, which was free from irritation. At the inner upper quadrant of the pupillary margin, a blackish-brown prominence was visible; it was four millimetres in length, and projected from the lower surface of the iris into the pupillary space. It projected above the pupillary margin about one millimetre during contraction, and

[1] Hirschberg: *Gräfe's Archiv*, Bd. xiv, 3, p. 285; Warren Tay: Ophthalmic Hospital Reports, v, p. 230; Schiess: *Virchow's Archiv*, lxix; and Hosch: *Centralbl. f. pract. Augenh.*, 1881, p. 361.

[2] *L. c.*

two millimetres during dilatation of the pupil. This prominence evidently was merely the free border, directed toward the pupil, of a larger tumor situated in the posterior chamber, for the iris was considerably crowded forward in the entire upper inner quadrant and even beyond it. The rest of the iris was normal; the pupil was round and dilated well under atropine, remaining round. The lens was in its normal position. Tn.

The patient not being very intelligent, knew nothing of her tumor. Inasmuch as the appearance of the tumor likewise furnished no diagnostic points, it was impossible to decide whether it was a melanoma or a melano-sarcoma. I thought, therefore, it would be the safest course to remove the tumor by an iridectomy. As the extraction of the cataract would subsequently have to be performed any way, the iridectomy could certainly do no harm, and at most be looked upon as a preliminary iridectomy. Inasmuch as a lancet could not have been brought forward far enough to secure a wound of sufficient width, owing to narrowness of the anterior chamber at the corresponding point, I made the incision with Gräfe's knife and excised the entire upper inner quadrant of the iris together with the tumor.

The examination of the excised portion showed the following (plate vii, fig. 1): The iris is very strongly pigmented, even where it is not occupied by the tumor. Not only the pigmented cells of the stroma contain an uncommon amount of pigment, but also the free pigment granules which are present in every iris are accumulated in unusual numbers. This is the case particularly in the anterior and posterior limiting layers, which consequently appear very dark in color. The strictly pathological proliferation of the pigment cells starts at a point corresponding in its position to the peripheral end of the transverse section of the sphincter (at *c*). At this point we find even in normal irides almost constantly an accumulation of roundish, tense, non-branching cells, which appear striking on account of their especially ample contents of (sometimes very coarse) pigment granules. The proliferation seems to have sprung from these cells; from there it extends in three directions toward the pupillary margin (*a*), toward the ciliary margin, and backward toward the uveal layer of the iris and the tumor (*b*).

The proliferation directed toward the pupillary margin forms a black wedge, which almost reaches the free border of the iris and lies rather nearer the posterior than the anterior surface of the iris. It seems to me to include the sphincter, of which no trace is seen elsewhere. To be sure, as a rule, the transverse section of the sphincter lies still nearer the posterior surface of the iris, but there are considerable variations in this respect; on looking through my preparations I found one in which the position of the transverse section of the sphincter exactly corresponds to that of the black wedge. This proliferation is quite black in its centre, so that no details can be distinguished; at the margin it separates into single black cells. The latter are roundish, without any processes, and very strongly pigmented, so that their nuclei are invisible; they are exactly like the cells which I have mentioned above as being found physiologically in the circumference of the sphincter.

A similar wedge of pigment extends into the iris in a centrifugal direction; passing at the same time obliquely forward, it reaches at one point the anterior surface of the iris. The main proliferation, however, has extended backward. A broad black band here perforates the posterior limiting layer and the uveal leaf of the iris, so as to spread behind it and form the tumor observed in our patient (*b*). That formation crumbled during the operation, only fragments of it, adhering to its thick black root, remaining in the specimen. Therefore in the illustration, I could draw the outline of the tumor only approximately. The tumor consists of an accumulation of cells which are so deeply pigmented that altogether they form a uniform black mass. Consequently, only at points where the tumor was lacerated it is possible to recognize its composition of massive cells, in which, owing to the abundance of pigment, no nucleus is visible. The tumor seems to possess neither blood-vessels nor even a stroma, otherwise traces of it would be apparent at the lacerated edges. At the central side, the posterior limiting membrane of the iris is partly reflected on to the surface of the tumor (at *d*). Nothing can be seen anywhere of the uveal pigment of the iris; probably it has been

brushed off during the operation. To me it appears certain that it has in no way participated in the development of the tumor.

This tumor is to be included among the simple melanomata, for it consists solely and exclusively of cells which are completely analogous to the pigment cells occurring physiologically in the iris. Sarcomata differ from it in the following particulars: Even in the most intensely pigmented sarcomata we always find some slightly or not at all pigmented cells in which the large nuclei and especially the large nuclear corpuscles characteristic of sarcoma-cells can be recognized. The fundamental tissue in the surroundings of the sarcoma shows proliferation of nearly all elements of the stroma and very frequently, too, deposition of round cells ("formative cells"). The sarcoma has a distinct stroma with blood-vessels. The only thing common to sarcomata of the uveal tract and the tumor under consideration is this, that both originate from the stroma cells of the iris and that the pigment epithelium plays a passive part herein.

Of course pigment tumors occur in the iris which do not spring from the stroma of that structure, but owe their origin to an hypertrophy of the uveal layer. Not rarely they are seen as a row of small hemispherical projections at the pupillary margin of the iris; I have seen a case in which a whole connected series of them had detached itself from the pupillary margin and floated in the aqueous humor in the shape of a black rosary-like formation. Also larger masses of pigment, probably of the same origin, floating free in the anterior chamber, have been repeatedly described. Perhaps the case of v. Gräfe quoted above belongs among them; for v. Gräfe expressly states that the tumor seemed to spring from the "pigment border of the pupil." Such iridal tumors, to the best of my knowledge, have not yet been examined anatomically. They would find their analogue in a case of melanoma of the choroid described by Knies.[1] The melanoma formed a node, two millimetres long and one millimetre broad, immediately behind the

[1] *Arch. of Ophthalm. and Otol.*, vol. vi, pp. 395, 396.

ciliary processes. "It lies between lamina elastica choroideæ and pars ciliaris retinæ. Externally it is covered with perfectly normal choroid, and consists exclusively of large, very strongly pigmented, roundish masses of protoplasm, without a trace of sarcomatous elements."

Explanation of Fig. 1, *Plate* vii.

Magnified 42 diameters.

a, Pupillary margin of the iris;

b, Melanoma;

c, Region of the posterior end of the transverse section of the sphincter.

d, Posterior limiting layer of the iris reflected on to the tumor.

ARTERIO-VENOUS ANEURISM IN THE RETINA.

By Prof. ERNST FUCHS, of Lüttich.

(*Plate vii, fig.* 2.)

Translated by William C. Ayres, M.D., N. Y.

A Bohemian, twenty-six years old, was struck on the right eye by a limb of a tree, in Oct., 1880. At the time there was only a small wound in the inner corner of the eye to be seen, and the eye was bloodshot for several weeks. Vision was not perceptibly diminished at first; after six months he noticed that he commenced to see badly, and he often had a sensation of pressure in the eye. He consulted a doctor, who determined $V=\frac{3}{20}$. In 1881, he came to Prof. von Arlt's clinic. At that time he could only count fingers at $\frac{1}{4}$ metres with eccentric fixation. The right eye looked normal; only a small cicatrix could be found with difficulty in the region of the caruncle; refracting media clear; refraction E. The papilla was not sharply defined, but otherwise normal; also the whole upper half of the retina except a few moderately conspicuous striations. Below, there were two large vessels, which were very conspicuous on account of their size and course (fig. 2). The vein passed almost perpendicular downward: the artery, which was to the outer side of the vein, on the papilla, passed over the vein at the inferior border of the papilla, and then ran downward and inward. In the first half of its course there were only isolated dilatations; between these it was narrower than normal,—in fact, in one place (where it ran downward) this was so much the case that the vessel could hardly be seen. The inferior half was distinguished from the superior in that it widened suddenly (cæcum-like). From this place the artery was as thick as the vein, and also as irregular in its course.

Both artery and vein disappeared in a large, somewhat ill-defined disc. The disc was prominent, covered with blood-spots, and so dark that no further details could be made out. Both the artery and vein were of the same dark color, and could only be distinguished from one another by their branches. The artery had three branches, which were normal in all respects. The vein had only two, the upper one of which was normal; the under greatly varicose, like a rosary, but not particularly irregular in its course. A branch given off from this was of normal calibre. Where the arteries crossed the veins they were in front of them.

There was no spontaneous pulsation; a slight pressure made the large vein and a large branch of the artery pulsate, the latter in the usual way. In the round tumor pulsation could not be produced.

Besides the above, the following changes were to be seen. In the region of the macula lutea, there was a white star-shaped figure, similar to that of Bright's retinitis. In the direction of the continuations of the rays of the star were also white spots. Four similar spots were found in a group below the papilla. On the inner side of the retina, there was a band-like figure, which grew narrower as it passed away from the papilla, and, at the same time, bent downward. I have never seen any thing like it in the background of the eye. It had a silvery reflex; its color could only be compared to that of those figures which we sometimes find in the region of the macula, in *neuritis e tumore cerebri*. They were accumulated in groups, which made the band resemble a cirro-cumulus cloud in the sky, differing in this particular, and also by their silvery reflex, from the figures which we meet with in Bright's disease. The band had the same silvery spots as at the macula. In the former there were many small curly black lines, looking like small worms. On closer examination we could see, however, that they were only the spaces through which the red choroid could be seen, but the latter appeared black from contrast. It could also be seen that the band was made up of small circular spots, which did not touch each other over the whole surface, allowing the above spaces to appear between them. Toward its peripheric end, the band was discontinuous in places. Several veins were seen to pass over the band. Since the patient was told that we could not promise to cure him, he went home. He afterward wrote that up to the end of Feb., 1882, his eye had not changed. He could see large objects with it, but that the middle seemed to be covered by a spider-web.

If we try to find out the significance of the various conditions we must explain the following points:

1. The round spot in which both the vessels ended seemed to me to be a spurious aneurism. I think that the trauma must have caused a rupture of both vessels, and a consequent pouring of their blood either into or under the retina. The latter seems the more probable, since the spot was too large to be in the retina itself. Also, in order to explain why the blood did not go farther into the tissues, we must consider that after a time the retina and choroid became attached to one another. There is nothing improbable in this, for the aneurism was gradually reduced to its present size.

2. Why are both artery and vein dilated? *A priori* one could conclude that the aneurism either helped or hindered the blood circulation. The first would be the case when the blood was saved the trouble of passing through intermediate capillaries, and emptied direct from the artery into the vein. The walls of the latter would give way to the increased blood-pressure, and the vessel become larger and tortuous. But then we could not understand why the artery was dilated. If the aneurism retarded the circulation we could explain the size of the artery, but not that of the vein. The diminished *vis a tergo* could not be the cause, or we would also expect to find large veins in embolism of the central artery. Perhaps we may consider it in this way: at the time just after the injury the aneurism was small; the blood went directly from the artery into the vein, and the latter became ectatic. Later the sac became larger, and there was an impediment because the blood could not find its way easily. In this condition, the artery would become ectatic and the vein would remain as it was. We might also consider that the larger artery could have compressed the vein where it crossed it near the papilla. If this were the case the branches of the vein should be equally dilated. However we consider it, we are certain that in all cases of aneurysma arterio-venosum, we almost always find the artery and the vein enlarged. The same was the case in Magnus' retinal aneurism. I am not able to

explain why the artery is dilated so irregularly, and why it almost disappears in places, and again why one branch of the vein should be dilated and the other not.

3. The changes in the macula, and to the inner side of the retina are perhaps microscopically the same as those we find in Bright's disease. They appear to be of more recent date than the trauma, and their advent was perhaps simultaneous with the diminution of vision. It is certain that they are not degenerated blood extravasations, or atrophic patches in the choroid, or heaps of cholesterin crystals: I consider them as something very different. From their analogy with the white spots of retinitis from cerebral tumors, I am inclined to look upon them as having been caused by the change in circulation, notwithstanding the fact that they were situated just at the place where the circulation has but little sway.

There is up to this time only one case of arterio-venous aneurism on record, that of Magnus.[1] This was also the result of a trauma. It differs from ours in the fact that the artery passed directly into the vein, there being no intermediate sac. Surgeon makes a sharp distinction between these two conditions. O. Weber[2] writes as follows: Aneurysma varicosum we call those forms in which the artery and vein are both ruptured, so that the blood not only passes from the artery into the vein but also into the connective tissue between them, and by a capsulation of this blood an aneurism is produced; by both vessels remaining open the blood from the artery goes into the vein.

A varix aneurysmaticus is produced, when "only a simple communication between both vessels occurs. There is no sac and no aneurism; but the vein becomes varicose under the increase of pressure." My case corresponds to the aneurysma varicosum; the varix aneurysmaticus, to that of Magnus. Magnus also says, that there was no difference in the color of the artery and vein, so that only by watching the smaller branches could it be said which was which. Magnus' explanation, that the arterial and venous blood became

[1] *Virchow's Archiv*, vol. lx, p. 38, 1874.

[2] "Handbuch der Chirurgie," by Pitha and Billroth, vol. ii, 2, p. 149.

mixed, was refuted by Leber,[1] by his saying that blood from a vein can never enter an artery. The fact of the same color in both artery and vein was also shown in my case. O. Weber further says of such aneurisms in general, that the artery sometimes looks like a vein on account of the condition of its walls. It is to be imagined both in Magnus' and our case that the enormous size and extensive filling of the vessels produce the same color in both, especially as the neighboring vessels which were not dilated were of a normal appearance.

[1] *Græfe-Sämisch*, vol. v, p. 528.

CONGENITAL ANOMALY IN THE CHOROID.

By Prof. E. FUCHS, in Liege, Belgium.

Translated by Swan M. Burnett.

(*With plate i.*)

Viertel Salomon, fifty-two years of age, from Galizien, presented himself at the clinic of Prof. Arlt on the 13th of January, 1880, on account of a dimness of vision in the right eye, which he had observed for the first time about a year previously.

In this eye there were found some peripheral opacity in the lens, a slight atrophic condition of the papilla, and some small atrophic spots at the periphery of the choroid. Fingers were counted at $\frac{3}{4}$ of a metre; the V F was moderately contracted—concentrically,—but there was no scotoma. The dimness of vision seemed to depend upon the atrophy of the optic nerve, for which no satisfactory cause could be found. An inunction treatment, continued for four weeks, and followed by the internal administration of iodide of potassium, was not attended by any material improvement in vision.

The *left* eye, which externally appeared normal and had V = $\frac{6}{6}$, showed an incipient decoloration of the disk. Aside from this there were the following independent appearances at the fundus. Upward and outward from the macula there was a large, irregularly-round figure, having a diameter four or five times as great as that of the optic disk. It was yellowish-white in tone, with a black background. The background was manifest on the surface of the figure only as more or less widely-separated black spots, but at the periphery it became even and pronounced. At the edge the bright figure terminated in numerous tongue- and knob-like processes, between and beyond which the black background came

out clear and distinct, forming a coal-black edge to it. This part showed a striking resemblance to the *arbor vitæ* figure in sections of the cerebellum. Here and there, in the black edge, were to be seen small white islands of a narrow spiral shape.

Two retinal vessels passed across the figure: one, an artery, over the upper part; and one, a vein, across the lowest projecting point. Aside from these, the whole extent of surface was checkered with a net-work of vessels, very similar in appearance to those of the choroid.

They ran in every direction, but all had a course toward the peripheral processes, and terminated at their apices, though occasionally some vessels crossed the projection and the intermediate dark patches transversely or obliquely.

If I had doubts as to these vessels being those of the choroid, it is because they differ in many essential particulars from the normal choroidal vessels. They are narrow, with mostly dichotomous branches, resembling thus more nearly the vessels of the retina, with this difference, that their color was somewhat brighter, and they were all alike, there being no distinction between arteries and veins. No connection could be established between these vessels and the two retinal vessels which transversed the figure. Nor could they be traced to any true choroidal vessels, but were sharply cut off at the edge of the figure, and besides, no choroidal vessels were visible in the background. The figure was apparently upon the same plane with the other portion of the fundus, and there was no defect in the visual field corresponding to the spot.

The appearance which the figure presents is in the highest degree striking. The sharply defined and elegantly outlined contour, the pure yellowish-white on the deep black ground, with the red vessels coursing over its surface, all combined to make an elegant picture, which reminded one of the most fantastically variegated carpet-pattern.

There can be no doubt but that it is a congenital anomaly. Against the fact of its being a result of choroiditis, we have the sharply-defined contour and the extraordinary regularity of the place under consideration, in spite of its large dimension ; and furthermore, the totally different character of the recognizable choroidal vessels.

Besides, there was to be found nowhere else in the fundus any evidence of choroidal disease, nor was there any functional disturbance (defect in the visual field) corresponding to the affected locality.

Regarding the anomaly as congenital, we can put it side by side with the colobomas, especially those at the macula.

It is not necessary to call attention to differences between this and the ordinary coloboma as regards form, color, and vascularization. Nor does the position precisely agree with that of colobomas at the macula.

If it is difficult to understand how a coloboma can occur at so high as the region of the macula, it is still less conceivable how such an alteration should occur at the upper and outer side of the posterior pole of the eye. And yet I think that we should not allow the abnormal position alone to influence us against considering it as at least analogous to colobomas.

Mittelstädt[1] has reported three cases of undoubted coloboma of the iris, one of which was directly outward, while the two others were directly inward, from which we may justly infer that there may be deviations from the positions ordinarily occupied by colobomas.

[1] These ARCHIVES, vol. ix, p. 427.

TWO CASES OF REMOVAL OF BIT OF STEEL FROM INTERIOR OF EYE BY MAGNET.

By J. LAUNCELOT MINOR, M.D.,

Assistant Surgeon to the N. Y. Eye and Ear Infirmary.

DURING last summer I treated the two cases whose histories are related below, and in each instance succeeded, with an electric magnet (Bradford's), in removing a piece of steel from the injured eye. In the first case, the eye, as an organ of vision, was lost before the patient came under my observation. In the second case, vision was fair when he was first seen, and useful sight was retained.

CASE I.—H. N., æt. twenty-seven, machinist, presented himself at the New York Eye and Ear Infirmary on the 27th of June, 1882, just twenty-four hours after the eye had been struck with a small piece of steel, which the patient stated had entered, and still remained in, the globe. V = 0; globe injected; slight exudation in pupil; no reflex from fundus; media too cloudy to admit of view of interior of eye, and globe too tender to measure tension. At a point 3 *mm.* from the limbus, on a level with the insertion of the external rectus muscle, was an opening through the sclera and other tunics of the globe 2 *mm.* long, in a horizontal direction. The possibility of extracting the foreign body, and the probability of enucleating the globe having been explained to the patient, he consented to place himself in my hands. It was about nine o'clock in the evening, and I operated without an anæsthetic. The lids being held apart with a speculum, I began by enlarging the wound in the globe—making a vertical cut about 3 *mm.* long, which, being at a right angle with the original wound, gave a tri-

angular flap that could be lifted forward during manipulation of the magnet. This step I consider an important one, for it reduces to a minimum the danger of having the particle of iron scraped off when the magnet is withdrawn. I now cautiously introduced the magnet—using the smallest point that is made for the instrument—to a depth of about 6 *mm.*, and then slowly withdrew it. Much to my satisfaction and somewhat to my surprise, the piece of steel came out with it, adhering to the point of the magnet. The piece of steel weighed 5 *cgrm.*, was 4 *mm.* long, 1.5 *mm.* broad, and tapered to a fine point at each extremity.

The wound was closed with a conjunctival stitch, and the eye was kept constantly covered with iced patches, and atropine was used every four hours. The pain was at once relieved. The injection subsided, and the media cleared up sufficiently to allow a view of the interior of the eye by oblique illumination. The lens was clear, with some deposit on its anterior capsule, and the front and anterior part of the vitreous was also clear. A dense whitish exudation was observed all around the ciliary region and in the posterior part of the vitreous. The eye did well for several weeks, when pain again returned, and the eye was finally enucleated on August 10th, because it was deemed unsafe to allow the patient to return to his home in the country with a useless eye, that was liable at any time to endanger its fellow.

Case 2.—G. L., æt. twenty-two, machinist, came to the New York Eye and Ear Infirmary on August 4, 1882, with a piece of steel in the left eye, that he had chipped off with a chisel from metal upon which he was at work one hour before I saw him. The piece of steel had entered the eye at its inferior corneo-scleral margin, passing through and beyond the cornea, iris and limbus of lens, and could be seen lying on the ciliary body. Slight cloudiness of the media prevented an easy view of the fundus and the examination was not persisted in. His vision was $\frac{20}{10}+$ and the V F showed no interruptions. He was at once placed upon the operating-table, and, without an anæsthetic, a slight enlargement of the wound of entrance was made, and the small point of a Bradford magnet was introduced just within the corneal wound, where it was held for a few moments with an idea of magnetizing the piece of steel. I was very pleasantly surprised at seeing the iris pressed forward toward the magnet, and through the opening in the iris the piece of steel present and attach itself to the point of the magnet. Owing to the jagged nature of

the piece of steel the iris caught upon it, and it was necessary to divide it as the steel was withdrawn thus making an iridectomy indispensable. The piece of steel weighed 1.5 *cgrm.*, was 6 *mm.* long, measured 2 *mm.* across at one end, and tapered to a blunt point at the other. There was some bleeding into the anterior chamber. The patient was put to bed and cold applications were kept constantly upon the eye, and atropine was instilled every four hours. Little or no reaction followed. The wound had united on the fourth day, and the blood disappeared from the anterior chamber a few days later. The case progressed favorably and the patient was discharged one month after the operation with vision of $\frac{20}{200}$. There were no inflammatory symptoms present, and the only opacities were in the lens and vitreous about the locality of the original wound. The lens showed also slight diffuse haziness.

I last saw the patient about the middle of December, when he had vision of $\frac{20}{100}$. The lens opacity was less in extent and density, and the diffuse haziness was also reduced. The opacities in the vitreous had also disappeared, and the fundus was normal.

Each one of these cases presents an interesting feature. The *first* proves that a piece of metal can, under favorable circumstances, be removed from the eye by a magnet, though its exact locality is unknown; and this suggests the careful use of the magnet in such cases. The *second* proves that the magnet is capable of attracting and moving a small bit of steel, when *in the vitreous*, a distance of 4 *mm.*, for the piece of steel was lying on the ciliary body behind the limbus of the lens, and the tip of the magnet was *not introduced deeper* than the corneal wound.

GLIOMA OF THE RETINA.

By Dr. U. VETSCH, of Zurich.

Translated by James A. Spalding, M.D., Portland, Maine.

TWO cases of glioma of the retina which I lately had opportunity of observing in their interesting complex of symptoms and course, led me to collect all the cases of this disease that had, up to this time, been observed at the clinic in Zurich.

Of the twenty-five cases which are entitled in the case-books as glioma of the retina, one has already been described.[1]

My chief aim has been to discover exactly what became of each case, especially of those which were operated upon, in order to solve, if possible, the doubtful question of the curability of glioma. For this purpose, I made inquiries of the proper authorities in every parish in which each patient lived, and succeeded without a doubt in discovering the final outcome of every case.

Before giving the history of the various cases, we would remark, that throughout this paper, where nothing else is said to the contrary, the gliomatous structure of the tumor was definitely demonstrated.

In four cases in which the eyeballs still lay in Müller's fluid (case 14, enucleation, December, 1872; case 4, September, 1877; case 20, June, 1878; case 22, January, 1881), teased-out preparations showed other cell-forms than simple round cells. Some of these were provided with two or more

[1] *Zehender's Monatsblätter*, 1863, p. 341.

off-shoots of different lengths, and occasionally reminded us of the forms generally assumed by living cells in amœboid movement. The longer the preparations had remained in the hardening fluid the more difficult it became to demonstrate these cells, but the fresher the preparation the more abundantly they were discovered. When the preparations are quite fresh, they seem to possess a decided number of these cells, as appears from the teased-out preparations of a freshly examined parotid tumor. It is difficult not to confound these cells with similar pictures, which are very confusing when remains of the interstitial tissue cling to the round cells. In order to come to a definite conclusion on this point, we must isolate the cells completely, and we can then at the same time convince ourselves of the origin of the off-shoots from the body of the cell itself.

This variation from the customary condition (small round cells) as described by Knapp,[1] Hirschberg,[2] Iwanoff[3] and others, was a great surprise to me; but I was still more surprised to find that the same cells that I had discovered had already been described by Virchow[4]: "These cells are also small, with very moderate cell-bodies, which as a rule, are of rounded shape, yet sometimes irregular and provided with delicate off-shoots." "We occasionally meet with isolated fibre-cells provided with very long processes and a very slender and short body; it sometimes happens that several of these are united with one another." Virchow also cites (p. 156) Von Rapp,[5] who in one case discovered somewhat irregular "globules" with granular contents, and in another, little bodies provided with tails.

It is a valuable fact that we have been able to demonstrate these cell-forms in the gliomatous tumors of the retina, since Max Schultze[6] has shown that they appear normally in the connective-tissue part, the granular and intergranular layers of the retina.

[1] "Intraoculare Geschwülste," p. 56.
[2] "Markschwamm," p. 92.
[3] *Archiv f. Ophthalmol.*, Bd. xv, Abth. 2, pp. 76, 77, 79, 83.
[4] "Geschwülste," Bd. ii, p. 164.
[5] *Von Ammon's Monatsschrift*, 1840, Bd. iii, p. 391.
[6] "Observationes de retinæ structura penitiori," Bonn, 1859.

Virchow (*l. c.*, p. 129) is undecided whether such cells appear in the neuroglia of the brain substance, while, on the contrary, Deiters[1] demonstrated the existence of star-shaped cells with numerous fine off-shoots which anastomose and form a delicate fibrillar net-work. This observation was supported by Jastrowitz,[2] who described the so-called "arachnoid cells," and Boll[3] with his "brush-shaped cells" from the spinal cord.

Virchow,[4] Th. Simon,[5] and Gogli[6] have already made mention of similar ramified cells in gliomatous tumors of the brain.

My investigations of a fresh case of glioma of the brain, and the comparison of teased-out preparations of the same with preparations of glioma of the retina, convinced me that the same cells are discoverable in both cases.

I will not be so bold as absolutely to deny the occurrence of round cells, for I found them in my own preparations as well as in a large majority of eyes which had been preserved for a long time in Müller's fluid (in which case, however, we cannot exclude the unfavorable influence of the hardening fluid). Still, in my opinion, the tendency to call glioma a small-celled, round-celled sarcoma ought to be opposed.[7]

Lemke has lately described[8] three cases of glioma (one of them a glioma of the retina), two of which contained round cells, the third polymorphous cells. He classifies glioma according to its cellular structure under three heads: (1) round-celled glioma; (2) glioma with polymorphous cells; (3) glioma with brush-shaped or spider cells.

Lemke divides the sixty-four cases which he has collected into twenty-five of the first variety, twenty-seven of the second, and eleven of the third.

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[1] "Untersuchungen über Gehirn und Rückenmark," 1865, p. 27.

[2] *Archiv f. Psychiat.* und Nervenkrankheiten. Bd. iii, p. 168.

[3] *Ibid.*, Bd. iv, 7.

[4] "Geschwülste," p. 131.

[5] *Virchow's Archiv*, Bd. lxi, Heft 1, 1874.

[6] *Medic. Centralblatt*, 1875, No. 36.

[7] Compare Nagel: *Jahresbericht*, 1871, p. 305; Hirschberg: these ARCHIVES, vol. x, p. 55; Alt: "Histologie des Auges," p. 199.

[8] *V. Langenbeck's Archiv*, Bd. xxvi, Heft 3, p. 525.

"It is interesting to notice," says he, "that all of the round-celled gliomata but one (which had its seat in the cerebellum) were located in the eye. Of the polymorphous tumors, twenty-one were situated in the brain and spinal cord, five only in the eye, and one in the auditory nerve. The remaining cases (brush-shaped, etc.) were simply discovered in the brain, with exception of one, which appertained to the spinal medulla."

Amongst our twenty-four cases are two (Nos. 11 and 13) which must be excluded from the category of glioma. For in the former, the anatomical examination revealed "hyalitis," while in the latter, death did not ensue, although no operation was performed. (This must have been a case of suppurative choroiditis.)

On the contrary, in case 17, we made a diagnosis of suppurative irido-choroiditis, and only discovered the truth (glioma) after further observation.

These three cases, and especially the two former, in which glioma was unanimously diagnosticated by several observers, revealed once more the difficulty of a correct diagnosis between glioma and suppurative choroiditis.[1]

Knapp (*l. c.*, p. 80) tries to differentiate the two conditions as follows: "The history, the whitish and dull reflex, and the never-failing symptoms of inflammatory degeneration, such as small grayish-brown synechiæ, frequent protrusion of the iris, and diminution in the size and tension of the eyeball, prevent us from confounding glioma with suppurative choroiditis and other inflammatory diseases."

Hirschberg (*l. c.*, p. 230) expresses himself in similar terms.

These distinctions, which *a priori* appear broad enough, have a much more limited significance in practice. Thus, in case No. 11, the tension was increased, and it was this very fact, conjoined with a widely dilated pupil, which led us to diagnosticate glioma of the retina, despite the fact that the history of the case showed a previous meningitis. In case No. 13, also, the globe was harder than that on the

[1] Compare also the case cited by Knapp (*l. c.*, p. 80), and described in *The Lancet*, 1854.

other side; while, on the contrary, in four undoubted cases of glioma (Nos. 8, 10, 17, and 18) the globe was not hard to the touch. The degrees of tension, consequently, are far from being constant, while, additionally, the history of the cases is by no means reliable, since two of our cases of glioma (1 and 18) were preceded by meningitis.

Considering all these facts, it would seem desirable to demand a modification of Hirschberg's assertion, "that no one, in our days, should possibly confound a glioma with simple inflammatory changes."

The *relative frequency* of glioma is about 0.03 per cent.; in 75,000 patients we have met with twenty-three cases of glioma. This percentage is smaller than that which Hirschberg reckoned from v. Gräfe's material (0.05 per cent.).

Although all previous statistics show a large preponderance of cases in the male sex, our twenty-two cases were equally divided between the two sexes.

The appearance of the disease in the right or left eye was about equally divided; for in eleven cases the right eye was affected, in ten the left; while in one case (No. 18), the affection was double at its first presentation. In three of the cases, however, the second eye became blind after the disease had made further progress (cases Nos. 6, 19, and 20).

The following table shows the age at which the glioma was *first perceived:*

Congenital	3 cases.
First and second year	5 " each
Third year	3 "
Fourth "	2 "
Fifth, seventh, and eighth years . .	1 case each.
Undecided (congenital, or in the first year)	1 "

The table agrees essentially with that given by Hirschberg (*l. c.*, p. 167), and as there, so here, the first and second years are chiefly affected.

It is quite plain, however, that the tumors must have begun at a much earlier date, and the above table suggests to us that most gliomatous tumors originate during fœtal life.

In the three congenital cases (14, 16, and 21) one eye only was affected, while Hirschberg (*l. c.*, p. 168) usually found the disease in both.

The *etiology* of glioma is not cleared up by our cases. They simply confirm the fact that a special dyscrasia does not exercise any influence upon the origin of the tumor. If in one case or another (19, 22, and 24) the weakness and sickliness of the children are mentioned, so in others (Nos. 6 and 7) their cheerfulness and health are emphasized. It is also very doubtful whether the few isolated diseases which preceded the appearance of the tumor can be accused as the cause of the glioma. Thus (in No. 23) we find "convulsions" mentioned, as well as whooping-cough followed by inflammation of the brain (case No. 1), whooping-cough with subsequent inflammation of the lungs (case No. 17), and inflammation of the brain (case No. 18). It is remarkable that other children in the same family have died from inflammation of the brain, while a sister of case 6, and two sisters of case 18, died of "convulsions."

This reminds us of those enigmatical cases in which several children of the same family have died of glioma of the retina.[1]

In two cases (7 and 16) we find mention made of congenital asymmetry of the face.

Nothing is said in our note-books of injuries as the cause of the disease.[2]

The *symptoms* of the various cases under our observation do not differ from those usually given in the text-books. In one case (No. 9) the yellow reflex was preceded for a long time by divergent strabismus, and closure of the eyelids when looking at any thing bright, a fact which proves that the beginning of the glioma must be dated back several months before the first reflex from the pupil was noticed. Case No. 23 had a ring abscess of the cornea which is evidently to be referred to an unusual exhibition of glaucomatous increase of tension.

In seven cases we discovered a hitherto unobserved symp-

[1] These ARCHIVES, vol. viii, p. 381. *Ibid.*, iv, p. 7.

[2] Steinheim: *Centralblatt f. Augen.*, 1877, p. 172.

tom, megalocornea, which in three cases (8, 14 and 20) was accompanied with enlargement of the entire globe, particularly of the anterior segment, while in the remainder the cornea alone was enlarged. Such a coincidence in one third of all the cases cannot be accidental, so that we must in the future recognize megalocornea as a further symptom of glioma.

This condition must be referred, as a matter of course, to the glaucomatous increase of tension. And if we reflect upon the fact that all of these cases belonged to the earliest period of youthful life (with exception of case 24, the characteristic yellow reflex was perceived a few weeks or months after birth), we must come to the conclusion that the cornea of new-born children or of the fœtus yields in circumference and sphericity to every increase of tension.[1]

Prof. Horner (*ibid.*) goes even farther than this, and uses these cases of glioma with megalocornea as a direct proof that the opaque keratoglobus is a congenital glaucoma. According to this view, megalocornea is *a direct result* of *primary* glaucoma.

There is no doubt that these observations give decided support to the views first formulated by Dufour, that *congenital hydrophthalmus* is probably an intra-uterine glaucoma.[2]

In considering the *course* of the disease we must distinguish between the operated and the non-operated cases.

There were nine cases in which the operation was not performed, either from too far advanced condition of the tumor, or from the unwillingness of the relatives or patients.

I took considerable pains to gain from the parents of the patients some description of the symptoms under which the children died, in order to discover if possible the special cause of death. But, of course, any such classification based upon the accounts given by parents has but little value, since the glaucomatous ciliary neuroses may give rise to symptoms (loss of appetite, vomiting, etc.) which cause us to suspect cerebral inflammation (No. 8); while, on the

[1] Horner: "Krankheiten des Auges im Kindesalter," p. 342.

[2] "Festschrift zu Ehren von. Prof. Horner," 1881, p. 124.

contrary, in cases in which intra-cranial disease was demonstrated by the autopsy, no cerebral symptoms were present during life (No. 6). The symptomatology of metastasis to the liver is also thoroughly doubtful, and it is questionable whether in any given case we are to ascribe the ascites and œdema of the feet, to such a metastasis or to the existing cachexia.

In every case except No. 4, the tumor extended outside the eye; death ensued in one case from metastasis to the liver (No. 1), in another from hemorrhage (No. 3), in three (Nos. 2, 4, and 6) from intra-cranial propagation (supported in one case by post-mortem examination), in four (Nos. 5, 8, 19 and 22) from cachexia.

The duration of these cases which proceeded *without an operation* can only be calculated from the time at which the disease was *first noticed.* Eight cases thus showed an average duration of sixteen months.

Of the *thirteen cases which were operated upon*, five are still alive; the fatal cases are tabulated below.

The symptoms under which death ensued were unknown in one case (No. 7); in three others (9, 10, and 15) the brain seems to have been affected (confirmed in one case by autopsy), while in the rest the patients appear to have succumbed from exhaustion, although violent headaches may have been noticed.

The tumor reappeared in five cases in the orbit on an average duration of six weeks, and caused death after an average period of eleven weeks. The whole duration of the disease (with the previously mentioned restrictions) averaged in these fatal cases twenty-one months, or fourteen months if we exclude the very slow congenital case No. 16. The duration of the disease is consequently rather shorter than if the affection is allowed to proceed spontaneously, although death was not directly caused by the operation in any case.

Symptoms of extension of the tumor outside the eyeball (protrusion of the globe) were already present in five cases at the time of the enucleation. Hence it would seem proper in the future to exenterate the orbit at once in all

such cases, and all the more since later observations have shown that this operative interference is frequently very effective.

No.	Symptoms of intra-ocular expansion of the disease before the operation.	Duration of the disease from the beginning to the operation.	Method of operation.	Duration of the disease from the operation to the relapse.	Duration of the disease from the relapse till death.	Total duration of the disease.
7	Protrusion	6½ months	Enucleation	1 week.	3½ months.	10 months.
9	Eyeball protruded outward and downward	18 "	Enucleation with neurectomy	1½ months.		19½ "
10	. . . . .	1½ "	Enucleation	2½ "		4 "
15	Eyeball somewhat protruded	4 "	Enucleation	1½ months. Followed by exenteration of the orbit.	2 months.	7½ "
16	. . . . .	61 "	Enucleation with resection of the optic nerve	3½ months.		64½ "
18	Exophthalmos. Sclera perforated.	10 "	Euncleation	4 weeks.	4½ months.	15½ "
21	. . . . .	24 "	Enucleation	1½ months.	3 "	28½ "
24	Eye excessively protruded	12 "	Enucleation	2½ "	1 month.	15½ "

Nellessen[1] published a case in which after a relapse into the orbit the whole cavity was exenterated, and the periosteum scraped off with a sharp spoon. The child was still alive four years and three months later. Brière[2] has also published one in which after extirpation of the relapsing tumor and cauterization of the inner surface of the orbit no relapse had taken place at the end of ten months.

It is quite plain that energetic interference should become more and more the rule; and, above all, we should insist that the operation for glioma is *one of the most* URGENT in surgery. A few days' delay may be fatal in the presence of a tumor of such rapid advance as this. Still, the fault in delaying the operation is more often attributable to the parents than to the physician.

Experiments like those of Albini (destruction of a retinal

[1] Inaugural Dissertation. Halle, 1872.

[2] *Ann. d'Oculistique*, t. lxxxi, p. 35.

glioma by means of a solution of chromic acid)[1] might just as well be omitted, considering the usual course of the disease.

We should not, on the whole, be influenced by the uncertainty of the diagnosis in these cases. We should not, like Mackenzie,[2] dissuade any one from the operation in the intra-ocular stage, but interfere actively in every case which is *probably* a glioma of the retina, even going so far as to run the risk of enucleating an eye which is blind from irido-choroiditis.

We shall do but little harm, at the most, in an occasional case, while often we shall do an immense amount of good.

Amongst the five cases of recovery after an operation, one (No. 17) deserves our especial attention. In this case, although the orbit has remained perfectly intact, a relapse appeared in the parotid gland after an interval of three years. The microscopic examination of the second tumor revealed the same elements as in the original growth. Primary gliomata of the parotid gland have never been observed,[3] hence the tumor in this case must be regarded as a relapse of the glioma. We are consequently forced to the conclusion that more than three years before, even before enucleation, the parotid gland had become affected by metastasis; that the germs of the tumor remained intact through three entire years, perhaps increased in a scarcely noticeable manner, in order, finally, excited by an operation (incision), to awake into all their danger.

This fact allows us:

(1) To confirm the experience that in a few rare cases the growth of the glioma is extraordinarily slow. Or, in the words of Mackenzie[4]: "The neoplasm may remain stationary for as many as three entire years, and then in a few weeks after beginning to advance, it may enlarge the eyeball three- or fourfold."

A second case (No. 16) strengthens the above assertion, for in this at the time of birth the left pupil was not entirely

[1] These ARCHIVES, vol. viii, p. 387.
[2] Cited in Hirschberg, *l. c.*, p. 234.
[3] Virchow: "Geschwülste."
[4] Hirschberg, *l. c.*, p. 214.

black, but larger than the right; still the tumor did not begin to grow rapidly until the child was five years old. I should not venture to sanction the history of the case as given by the parents, did not an undeveloped auricle and congenital facial paralysis increase the probability that the tumor also was congenital.

(2) To draw the conclusion that the cure cannot be said to be absolute until at least three and a half years have passed without relapse, or, as Chelius says: "Even when the result after two or three years seemed brilliant and permanent, yet death was caused by the appearance of a glioma in other portions of the body, although the cicatrix of the operation remained in the best condition." Hirschberg, however, grants this (*l. c.*, p. 243) assertion, so far as sarcoma of the choroid is concerned, but not in the case of glioma of the retina.

The same case (No. 17) is worthy of notice, since, despite the fact that the eye was filled with the tumor and the sclera already perforated, yet no local relapse appeared.

Case No. 20 (left eye) was without relapse for three years and a month, while in the right eye glioma appeared, quite independent of the left. This case is analogous to two similar cases described by Hirschberg and Happe,[1] and by Agnew, as cited in Vogler.[2] While, however, in these two cases, enucleation of the second eye was undertaken, and a radical cure obtained in Agnew's case (*postea*), we could not decide in favor of such a procedure. Although from the strictly medical stand-point *of saving life* such a step is permissible, and perhaps even ordered, yet, on the contrary, it seems inhuman thus to preserve life to a blind child. It would appear most suitable to cling to the old rule, *not* to operate when the disease has affected *both eyes*, and *not to operate again* when the disease also affects the previously healthy eye.

In case No. 23, no relapse had occurred eight months after the operation.

In addition to these three temporary recoveries, we have

[1] *Gräfe's Archiv*, xvi, 1, p. 297, and these ARCHIVES, x, 65.

[2] These ARCHIVES, viii, 387.

two undoubted results to subjoin: case No. 12 with no relapse for nine years, and case No. 14 for seven years.

The *literature of permanent recoveries* may here be cited.

1. Hirschberg ("Markschwamm," p. 251), six years.
2. Hirschberg (*ibid.*), seven years.
3. Hirschberg (*ibid.*), twelve years and six months.
4. Nellessen (*ubi supra*), four weeks and four months.
5. Landesberg (*Gräfe's, Archiv*, Band xxi, page 95), six years.
6. Hirschberg (Vogler: These ARCHIVES viii, 385), three years and six months.
7. Agnew (Vogler: *ibid.* 387, and *Centralbl f. Aug.*, 1880, 330), six years.
8. Nettleship (R. L. O. H. Reports, vol. ix, p. 56), five years. But the note: "Mr. Critchett informs me that he believes the child to be still alive and well, having heard nothing of the case since the operation," gives rise to doubt regarding the success of the operation.
9. Lawson reports a case of Hulke; six years without relapse (Vogler; these ARCHIVES, viii, 388).

We will now add a brief *résumé* of our cases, twenty-four in number.

1. Johann F., æt. three years; 22d August, 1862; had the whooping-cough last autumn; followed by inflammation of the brain. The right eye altered in appearance since April; pupil very wide, and the retina extensively detached, downward and outward.

May 9, 1864.—An enormous tumor projects from the right orbit. The patient died November 11, 1864, with symptoms of "dropsy."

2. Johann L., æt. five years; June 5, 1864. The left eye (without assignable cause) has been affected since November; tension harder than in the right eye; pupil dilated, yellow reflex.

October 31, 1864.—Large extra-ocular tumor, severe headaches, obstinate vomiting, etc.

February 18, 1865.—Death.

3. Barbara Z., æt. six months; August 1, 1864. The right pupil has a yellowish reflex, and a tumor covered with vessels is visible within it to the naked eye.

February 21, 1866.—The tumor has penetrated near the rectus inferior.

July 3, 1866.—Death. "The tumor enlarged enormously; occasional hemorrhage took place from it and materially weakened the child."

4. Emma G., æt. seven years; August 17, 1865. The right pupil was observed to be very much dilated, only sixteen days before. A detachment of the retina without a tumor is visible. The father declines the proposed enucleation. From November, 1866, the child complained of weariness and headache; then ensued attacks of total loss of consciousness. Death, March 11, 1867.

5. Ludwig F., æt. three and a half years; August 27, 1865, Reflex from the right eye since June. Right pupil wide, iris discolored. A citron-yellow reflex is visible from the thick meshwork of neoplastic vessels on the surface of the protruded retina.

According to the mother's report, the tumor grew out of the eye, and the child died February 9, 1866. It had never complained of headaches; it did not vomit, nor have convulsions. It appeared to die simply from exhaustion; no hemorrhage.

6. Cassimir P., æt. two years; October 7, 1868. A bright and cheerful child, the youngest of nine, one of whom (the fourth child), a sister, died at the age of nine months, "of convulsions."

The parents noticed a white spot in the right eye eight months before; divergent strabismus for four months. Death, May 18, 1869, previous to which the diseased eye had been of enormous size. Convulsions and vomiting were absent and the consciousness always preserved. The healthy eye became blind a short time previous to death. Intracranial propagation.

7. Anna R., æt. four; 30th December, 1868.

The child began to complain of pain in the right eye a week before. But a neighbor had noticed as far back as August that the eyes were "different." A healthy child, but somewhat pale.

Asymmetry of the frontal bone, slight œdema of the right upper eyelid; right eye slightly protruded, but its motions unimpeded. Eyeball hard, anterior chamber shallow, pupil moderately wide and immovable; yellow reflex. The fundus of the eye lies close to the posterior-capsule, and exhibits a homogeneous yellow structure with long furrows.

May 9, 1869.—Lens dislocated inward, and lying against the cornea. Transparent scleral staphyloma close to cornea. The patient sleeps a great deal, but does not complain of headache.

May 11*th*, 1869.—Enucleation; optic nerve gliomatous.

May 18*th*.—Relapse.

August 28, 1869.—Death; no details.

Macroscopic description of the preparation.—Anterior chamber

abolished, periphery of the lens applied to the cornea, and the lens pushed inward by tumor, which has squeezed itself between the latter and the ciliary body. Ciliary body infiltrated. The choroid is thickened, except near the optic nerve, where are several nodules of various sizes. At the macula it is 8 *mm.* thick, and intimately connected with a crumbling tumor which belongs to the detached retina and completely fills the ocular cavity.

The optic nerve 8 *mm.* behind the globe measures 6 *mm.* in thickness.

8. Johann B., æt. thirty weeks ; 8th December, 1870. Six weeks after his birth the left pupil was gray. When the boy was fourteen weeks old the left eye began to grow large, and had increased rapidly in size in the last three weeks.

Left eye bulged directly forward (4 *cm.*) ; cornea dry, yellow, and larger than the right. Globe also enlarged, but soft. Behind it an elastic tumor. DIAGNOSIS : Glioma of the retina, which has extended along the optic nerve and moderately developed in the orbit.

December 19, 1870.—Death, after the tumor had increased still more in size and the cornea had broken down. Death was preceded by loss of appetite, obstinate emesis, and violent shrieking. Nothing abnormal in the brain.

9. Louisa V., æt. two and a half years ; 20th January, 1871. The right eye began to squint outward, and to close when exposed to too bright light, in the previous July. White reflex during the last eight weeks. Right pupil enlarged *ad maximum*, anterior chamber very shallow, lens pushed forward, eyeball hard, yellow reflex.

The anterior (nasal) surface of the glioma is partly covered with numerous neoplastic vessels, and partly with large flat extravasations. Between the nasal and temporal portions of the tumor lies the detached retina like a vertical fissure.

January 4, 1872.—Right globe stony-hard, and protruded outward and downward ; the child has continuous and frequently violent pains, and hold its head while groaning ; emesis.

January 5th.—Enucleation, with subsequent excision of a portion of the gliomatous optic nerve half an inch long. At first the operation seemed successful, the general condition improved, but on 13th January, emesis and terrible headache reappeared.

February 2d.—Condition about the same, great emaciation, left pupil dilated and immovable. The ophthalmoscope showed nothing but engorged veins.

February 15*th.*—Death. The right orbit was completely cicatrized, and the optic nerve as large as a lead pencil; the left optic nerve slightly thickened, and its sheath very much injected.

The space between the two optic nerves is occupied by a very vascular, soft, pulpy neoplasm, which appears like a projection of the lower surface of the right temporal lobe. The floor of the third ventricle is curved steeply downward and thickened, while the ventricle itself is occupied by a soft grayish-red neoplasm the size of a walnut. A vascular, round, and extremely soft neoplasm has penetrated the floor of the right lateral ventricle, and appears to be connected with the tumor in the third ventricle, and only separated from it by the right limb of the fornix. The liver is somewhat enlarged and interspersed with numerous superficial and central white and reddish pulpy nodules as large as a bean or hazel-nut.

Macroscopic description of the enucleated eye: the whole of the space behind the lens is filled with the tumor, the anterior half of which is white and crumbling, the posterior half firmer and slightly pigmented. The tumor extends directly into the choroid which is still present in the anterior portion of the globe. The retina has disappeared.

10. Samuel C., æt. eight years; March 22, 1872. The patient, for the first time in his life, complains of pain and lachrymation in the right eye. The globe is not hard. A whitish-yellow mass, covered with extravasations, lies behind the lens and occupies most of the inner and lower portions of the eyeball. The upper surface of the yellow tumor shows a *white isolated nodule, which protrudes entirely from the structure.* This circumstance induced us to believe in the possibility of a cysticercus, in addition to a glioma. But in the further progress of the case we saw that the tumor gradually increased in size, and separated the iris from its ciliary attachment, and with its grayish-red granulomatous surface became visible between the iris and sclera. The globe at the same time became exceedingly hard, but did not protrude.

April 13.—Enucleation; recovery without any accident.

June 29.—The patient was suddenly attacked with violent pain in the left kneejoint, and convulsions. He became sleepless, and died July 3d.

Description of the preparation: Lens pressed forward, retina detached, and metamorphosed into a tumor filling the larger portion of the eyeball. The anterior portion of the choroid and ciliary body infiltrated and thickened (4 *mm.*); posterior half of the choroid and iris apparently uninvolved.

11. Caroline W., æt. two years; April 8, 1872. Patient was attacked about Christmas, 1871, with meningitis, convulsions, and loss of consciousness. Ten days later the right pupil was enlarged, and showed a bright reflex. The globe is hard and the pupil dilated *ad maximum*. A tumor arises from the inner side of the retina, and is covered with extravasations and blood-vessels.

The autopsy, however, showed that the case was not a glioma, but simple hyalitis. Enucleation was performed April 18th, the child discharged April 30th, and was bright and cheerful till May 16th. Death followed after a short illness, which, so far as we could learn, was evidently of cerebral origin. The relatives did not notice any thing especial in the orbits.

12. Lina G., æt. thirteen months; December 3, 1872. The right eye has been affected for nine months. The cornea is much larger than the left, and cloudy. The yellow tumor is visible behind the lens.

December 14th.—Enucleation. The father writes that the child is still perfectly well, and that the left eye has continued unimpaired (ten years).

Description:—Periphery of the iris adherent, lens resting on the cornea, choroid intact. The retina is detached in the shape of a cord by a fluid exudation, and at the posterior pole of the lens passes over into an irregular knobby tumor as large as a bean (10 *mm.* in its general dimensions). The transverse diameter of the eyeball is 21 *mm.*, the sagittal 22 *mm.*, the diameter of the cornea $13\frac{5}{10}$ *mm.*

13. Vincentz H., æt. two and one-half years; February 11, 1873. Convergent strabismus for one year and a half in the right eye, in which for six weeks a "peculiar" glitter has been noticed. The patient was never sick, but slow in learning to sit and walk alone. Right anterior chamber shallow, globe not prominent, and capable of movement in all directions; it is somewhat harder than the left. The outer portion of the retina lies close to the cornea, while the inner portion is only detached and less projecting.

July 18, 1881.—The boy is still well, although the proposed operation has never been performed. The eye is amaurotic.

14. Albert B., æt. eight months, September 23, 1874. The parents noticed from his birth that the left eye was abnormal. The front of the eye and the cornea are much enlarged. The yellowish-white protruding fundus covered with vessels can be easily seen behind the transparent lens. Tension + 1. A month later the eye was enucleated. The boy is now healthy and goes to school. Dr. Pflüger, of Lucerne, informs me that the tumor was undoubtedly a glioma.

15. Regina N., æt. two years; March 11, 1875. The left eye has been affected since last December, and now appears more prominent than the right.

April 2.—Enucleation; relapse in six weeks; exenteration of orbit; relapse. The child died in six or eight weeks with cerebral symptoms. Hydrops of the lateral ventricle, and nodules of glioma at the intracranial portion of the optic nerve.

16. Emil S., æt. five years; January 24, 1876. At birth the left pupil was slightly gray and larger than the right.

The left auricle is quite rudimentary and dependent; the left half of the face smaller than the right; left facial paralysis from birth.

Left eye glaucomatous, pupil very large, cataract; yellowish-red reflex.

February 19th.—Enucleation and removal of the entire optic nerve.

March 18th.—The boy is suffering with headaches, epistaxis, and general weakness; loss of appetite.

May 30, 1876.—Death.

Description of the preparation.—The interior of the eye is filled with a tumor, which in front is finely, and behind coarsely, pigmented. The retina is entirely lost in the tumor, while of the choroid only portions are visible at the equator. The optic nerve (attached to the eye) is 1 *cm.* long, 7 *mm.* thick, and is nowhere distinctly defined from the tumor in the interior of the eye. Posterior pole of the sclera bulged and thinned.

17. Anna M., æt. one year; June 30, 1876. The child became ill in January; whooping-cough, followed by inflammation of the lungs; since then the right eye "has looked queer."

Right pupil much dilated; a yellow reflex from the lower and inner portion of the viteous chamber. Tension normal.

By lateral illumination it seems as if this were a case of inflam-

matory cicatrix, subsequent to irido-choroiditis. Eye sensitive and slightly divergent.

July 6, 1877.—The whole field of the pupil is filled with a yellowish-red tumor, which below has extended forward as far as the cornea, carrying the lens before it. A nodule of the tumor as large as a pea has already penetrated the sclera. Tension normal.

September 4th.—Enucleation.

Description of the globe.—A solid tumor fills the interior of the eye. A nodule of the same has penetrated the sclera at the corneo-scleral junction. The optic nerve is cut off short and not thickened.

July, 1881 (four years later), the child came to the hospital with a large tumor in the right parotid region, which had made its appearance in October, 1880. It grew at first very slowly, but becoming soft after being painted for months with tincture of iodine, it was incised in March, 1881. Latterly it has grown with great rapidity.

The child is well nourished and sound. The right orbit is empty, and the mucous membrane healthy. A soft tumor, as large as one's fist, lies in the right parotid region. The over-lying skin is movable, and entirely free from attachments to the tumor. The tumor itself is also wholly disconnected from the inferior maxillary base ; nor does it extend toward the pharnyx. No swelling of the glands. No cerebral symptoms.

Ophthalmoscopic examination of the left eye shows nothing abnormal. Objective condition of the thorax and abdomen normal.

A gliomatous relapse of the right parotid gland was diagnosticated, and the total extirpation of the tumor accomplished (July 16th) under antiseptic precautions.

July 27th.—Boy went home after perfect recovery by first intention.

Microscopic examination of the deliquescent tumor : Sections show a small-cell, round-cell sarcoma, with moderately abundant fundamental tissue. Traces of spindle-cells are occasionally seen along the course of vessels. Teased-out preparations, however, show a large number of those polymorphus cell-forms previously mentioned, as well as small round cells and spindle cells. The cells, on the whole, correspond with those of the original tumor and of cerebral glioma. The father wrote us in September, 1881, that the child was cheerful and well.

18. Barbara B., æt. two years; January 7, 1877. In May, 1876, "inflammation of the brain," simultaneously with two sisters, aged five and six years, who died.

The yellowish color of the pupils was first noticed at the beginning of the winter.

Left eyeball: tension normal; total detachment of the retina, beneath which a thick whitish-yellow mass is visible.

Right eye.—A very convex whitish-blue tumor (5 PDD) is visible in the external half of the retina.

The left cornea was perforated by the tumor in July. This was followed by exophthalmus. At a later date the right eye also became blind.

August 24, 1877.—Enucleation of left eye.

Relapse a few weeks later. At the end of six months the tumor reached 35 *cm.* in circumference, and the child's neck and mouth were so swollen that nourishment could not possibly be taken.

February 8, 1878.—Death.

19. Gottlieb F., æt. two and one half years; July 5, 1877. Has always been a very weak child, but never seriously ill.

The left eye has been painful and red for five days. Pupil wide, globe hard, funnel-shaped detachment of the retina by a tumor. The child is very dull and apathetic.

Report from the pastor: The left eye protruded more and more from its cavity, as the latter became filled with a sponge-like tumor. Nine months later the right eye suddenly became blind, and the child died September 29, 1878, of exhaustion.

20. Eliza N., æt. seven months; May 31, 1878. The parents had noted for three months a yellow reflex from the left eye.

Left eye.—Megalocornea. The globe also is considerably enlarged and hard.

The ophthalmoscope shows a yellowish tumor at the left, covered with vessels and extravasations.

June 20th.—Enucleation of the left eye.

Description of eye: The iris and ciliary body have disappeared, and the lens lies close to the cornea. A small cord, evidently the detached retina, passes from the posterior surface of the lens to the optic papilla. At both sides of this cord extends a compact tumor, which reaches to the sclera in front; does not quite fill up the interior of the eye behind, but leaves a space which had evidently been occupied by a serous fluid.

August 21, 1881.—*Left* eye: No trace of a relapse. *Right* eye: A yellow reflex from the fundus of the eye for one year, in spite of which the child still saw well and ran about. Amurosis did not appear till New Year's day. No protrusion; movements of the eye normal. Since losing its sight, the child has not attempted to walk; no cerebral symptoms.

21. Paulina H., æt. two years; January 27, 1879. The father noticed a "spot" and a dull reflex in the left eye, directly after the birth of the child; yellow reflex for five weeks; eye hard; pupil wide, and a knobby tumor behind the lens. Incipient cerebral symptoms.

The father gave the following information concerning the course of the disease:

A few weeks after the enucleation (February 5, 1879), new tumors appeared upon the right half of the forehead as well as in the left orbit, increased in size, and finally covered the whole face. The child gradually became exhausted, but retained consciousness to the last. On the day of its death (June 15, 1879), spasms in the hand, feet, and face.

22. Francisca M., æt. three years; October 4, 1879. The right eye of this weakly child has been affected for about a year. Cornea dry and phthisical; above it a tumor as large as an apple, still covered with conjunctiva and extending backward into the orbit.

The child died January 9, 1880. The gliomatous tumor had already spread down over the face.

23. Albert T., æt. seven months; November 5, 1880. Child subject to "convulsions." The brilliant reflex of the left pupil was first observed at night six weeks before. Diameter of the cornea (13 *mm.*) larger than that of the right. The cornea is also opaque, and shows the symptoms of a ringabscess. The globe is harder than the right; yellow reflex from the detached retina.

December 9, 1880.—Enucleation.

The gliomatous tumor fills the entire vitreous chamber, but does not extend beyond the iris. The choroid is intact, the retina invisible, the sclera not perforated.

July 24, 1881.—The child is still perfectly well.

24. Rudolf G., æt. two and one quarter years; January 15, 1881. The child is weak, and has had a yellow reflex from the left pupil for one year. Megalocornea (14 *mm.* Diameter of right cornea 11 *mm.*). The lens is dislocated outward and

downward, and is cataractous. A knobby yellowish-red tumor is visible in the field of the pupil. The eye is noticeably protruded, and the lids very much swollen.

January 22d.—Enucleation; for which purpose the external canthus had to be divided.

Examination of the globe shows that the whole vitreous chamber is filled with the tumor; the choroid invisible to the naked eye, except in the anterior segment of the globe, and the retina entirely absorbed in the tumor. The eyeball is bulged at the posterior pole, at which the sclera is thinned, and Tenon's capsule thickened (3 *mm.*).

The optic nerve is apparently intact, 10 *mm.* long, and shows indications of a glaucomatous excavation.

May 1, 1881.—Three relapsing tumors were discovered in the left orbit. The father informed us that the child died May 13th.

A CASE OF CYSTICERCUS CELLULOSÆ IN THE VITREOUS; EXTRACTION OF THE PARASITE; PRESERVATION OF THE EYE AND OF THE VISUAL POWER PRESENT.*

By C. G. HAASE, M.D., Hamburg, Germany.

Translated by Isidor Furst, New York.

ON Jan. 26th of this year, a patient was admitted to my ward with the diagnosis "detachment of the retina."

The patient, æt. twenty-one, a shoemaker, stated that he had never been sick, and asserted that he had never suffered from tape-worm. Only for the past two weeks he had observed a veiling of the right eye, which was followed a few days later by a small black ring surrounded by a larger one. During the examination instituted the next morning, it appeared that there really existed a detachment of the retina in the right eye; but in the centre of the detached portion, which was situated above inward from the papilla, a perforation had taken place, from the opening of which protruded the head and neck of a cysticercus in the most active motion. Through the diffuse and scattered greater opacities suspended in the vitreous, the details in the fundus, especially the papilla and the retinal vessels, could be seen only indistinctly and as through a veil. The head of the cysticercus, the vesicle of which was still attached partly in and beneath the retina, was, as above stated, in very active motion. Now it was directed upward, then downward, then to the right, and again to the left; at the same time could be observed great activity of the suctorial disks, recalling the motions of the tentacles of snails.

* From a paper read before the Medical Society of Hamburg.

We immediately attempted a drawing of this interesting picture, but the motions of the parasite were so quick that, after just finishing a sketch and a few minutes later again looking into the eye, a completely altered appearance was found. Although the retinal detachment was not very extensive, the visual power of the patient was reduced to the perception of movements of the hand at a distance of two to three feet. After a few days the aspect in our patient had altogether changed. The cysticercus, heretofore still partly attached beneath the retina, had now completely perforated the latter and floated in the posterior vitreous chamber in the form of the well-known blue vesicle with shining margins. The spot where the retina had been detached, could still be recognized by the dirty yellowish stripes. Externally, the eye was free from every appearance of irritation, nor did the presence of the parasite in the eye of our patient cause the least inconvenience or pain. According to A. v. Gräfe and other authors, a space of time of from three months to two years will suffice, if a cysticercus is present in the eye, to completely destroy the latter by irido-choroiditis. However, that this lapse of time is not always sufficient for the destruction of an eye, is proved by a case of cysticercus in the vitreous which I had an opportunity to observe for more than three years, not the least symptoms of irritation of the eye appearing during that time. This latter case, in which the parasite and all its motions were very distinctly visible, I had exhibited, in 1870, to a large number of physicians, and of late I have made strenuous endeavors to find the patient again and bring her before the Society, together with the present patient, but did not succeed. Possibly she may have died or emigrated. She most emphatically declined the extraction of the parasite, which had been repeatedly proposed to her at the time, because it did not cause her the least inconvenience.

To be sure, such an exceptional course must not induce the physician to refuse or neglect the operation for the removal of the parasite. Sooner or later every eye affected with a cysticercus is bound to perish, and may even have injurious consequences on the other eye by the inevitably occurring irido-choroiditis. Should vision be entirely lost, the form of the eye have suffered by the inflammatory process, and the patient be tormented by violent pains, we would prefer to perform enucleation at once, as the most certain method of removing the parasite. The sooner the operation is done, and the less the eye has suffered by the presence of

the cysticercus, the better the results obtainable by the extraction. The experiments made by A. v. Gräfe to kill the worm by instilling anthelmintics into the eye have been given up by him as without effect.

On February 9th, I performed the extraction of the cysticercus under chloroform, by the method introduced by Alfred Gräfe under the name of "meridional scleral section." The globe having been drawn inward as far as possible, I first made an incision into the conjunctiva, one to one and a half *cm.* in length, as far back as feasible, and detached it on both sides of the incision so as to expose the sclera. The hemorrhage having been completely arrested, I made an incision, eight to ten *mm.* in length, with a small cataract knife, down to the vitreous ; I then waited some time, hoping that the cysticercus perhaps would spontaneously come out through the gaping wound or be perceptible. As this did not occur, I introduced a small iris forceps twice into the vitreous in order to seize the worm, but in vain. Therefore I widened the wound with small scissors by a few millimetres, and the cysticercus, after another introduction of the iris forceps into the vitreous, subsequent to its withdrawal spontaneously fell into the conjunctival sac.

To my great surprise, as well as that of the physicians present, the operation passed without appreciable loss of vitreous. Now I first joined the scleral margins and then the conjunctiva bulbi by two catgut sutures respectively, and applied a pressure bandage ; the operation, like all those performed for several years in the eye wards, was done under spray and all antiseptic precautions. The healing of this wound—a large one comparatively for the eye—proceeded without the slightest reaction. On the following day, the conjunctiva was slightly swollen and injected only at the point of incision and around the sutures, but not even reddened at the remaining circumference of the globe ; cornea, aqueous humor, and iris likewise showed quite normal conditions. In the course of the next few days, there were some slight injection and swelling at the point of incision, probably partly caused by the sutures, which I allowed to remain quiet. Therefore, for the succeeding eight days I kept on a pressure bandage, so as to obtain as complete a healing of the wound as possible, and to avoid an ectasia at that spot. On the thirteenth day after the operation, I again exhibited the patient to the medical society.

Vision was still the same as before the operation—that is to

say, the patient saw movements of the hand at two to three feet; possibly the visual power will improve in time, when the detached retina has become permanently replaced, and the vitreous opacities due to the presence of the cysticercus and the operative interference have disappeared. It was impossible to determine whether the eye had had normal vision previous to the affection. The diameter of the vesicle of the extracted cysticercus was eleven *mm.*; the length of the parasite, including its head and neck, sixteen to seventeen *mm.*; hence one of the largest specimens removed from the eye. The ophthalmoscopic examination of the patient, about two weeks after the operation, showed :—vitreous filled with isolated small flaky and diffuse opacities, so that the details of the fundus could be recognized only with difficulty. The point of the retinal detachment, above-inward from the papilla, is still distinguishable by dirty grayish-blue folds, and the papilla perceptible only by its converging vascular trunks, its outlines hazy, as if covered with an exudation which seems to extend into the retina. The former incision looks like a fresh choroidal rupture. The sclera is seen exposed, retina and choroid have been retracted from the margins of the incision to a distance of half a papillary diameter. The stripe is narrowest in the centre, and expands upward and downward; in some places small fresh extravasations of blood seem to be present. The eye itself appears free from irritation, and the patient experiences no inconvenience.

To the best of my knowledge, Alfred Gräfe[1] was the first to attempt the extraction of a cysticercus situated in the most posterior part of the vitreous, and subretinally in the neighborhood of the optic nerve—an operation well known to have been looked upon as a *noli me tangere* by A. v. Gräfe in 1868. In a series of cases published by Dr. v. Kries[2] and himself, the extraction of the parasite succeeded completely, not only the form of the eye being preserved, but the retinal detachment permanently cured, with a greater or lesser retention of the visual power. Only in two of the reported cases did the extraction of the parasite fail. A similar case of extraction of a cysticercus with

[1] Weitere Bemerkungen über die Extraction des Cysticercus von Alfred Gräfe. *A. f. O.*, xxiv, 1, pp. 161–210.

[2] Casuistische Mittheilungen aus der Augenklinik des Prof. A. Gräfe, Halle. Von Dr. N. v. Kries. *A. f. O.*, xxiv, 1, pp. 148–160.

preservation of the eye and vision was reported by Herman Cohn.[1]

It is well known that the occurrence of cysticercus is very variable in different countries, corresponding to the mode of life of the inhabitants. According to v. Gräfe's statements, among 80,000 eye-patients treated by him in Berlin, one tenth per cent. are said to have been affected with cysticercus; while Hirschberg[2] found one cysticercus among 500 patients, or one fifth per cent., as stated by him in connection with the demonstration of an extracted cysticercus. Wecker, among 60,000 eye-patients, observed only a single case of cysticercus, and Mauthner not one among 31,000. A. Gräfe, of Halle, claims to see, among 4,000 to 5,000 patients annually, five to six cases of cysticercus, or rather more than one tenth per cent. I, myself, among 30,000 patients treated by me in Hamburg, have seen altogether five cases of cysticercus, of which one was beneath the retina, two in the vitreous, and two beneath the conjunctiva. The latter two I removed without any difficulty. The case of subretinal cysticercus, and that situated in the vitreous mentioned above, refused the operation, and I can report nothing as to the final result, as I have lost sight of both patients.

[1] Extraction eines subretinalen Cysticercus mit Erhaltung des Sehvermögens von Prof. Herman Cohn, Breslau. *Centralbl. f. A.*, von Prof. J. Hirschberg, 1878.

[2] Kleinere Mittheilungen von J. Hirschberg. *Centralbl. f. A.*, 1879, p. 173; comp. also Hygienisches aus der Augenklinik von J. Hirschberg. *Börner's Zeitschr.*, 1876, No. 6.

REPORT OF THE EIGHTH SERIES OF ONE HUNDRED CONSECUTIVE CATARACT-EXTRACTIONS, WITH REMARKS.

By H. KNAPP, M.D., of New York.

THE present series of cataract-extractions is the continuation of the seventh hundred on which I reported, September, 1881, in the 10th volume of these ARCHIVES, p. 295, etc. The method of operating has undergone some alterations. The corneal section gradually shifted from the peripheric-linear of V. GRÄFE into the circular-marginal of DE WECKER. The excision of the iris in cases where the capsule was healthy, has been less extensive than before. The opening of the capsule has been subjected to some experimental variation in its execution, of which none, however, has shown a superiority over the method described in my former reports, namely, the peripheric incision along the corneal section with a sharp needle-cystotome. The expulsion of the lens was effected in all cases by external pressure, even if in complicated and hypermature cataracts the lens was intentionally expelled together with its unbroken capsule. The removal of cortical remnants has been done less persistently than before. The utmost care has been taken to prevent any foreign substance—conjunctiva, blood, iris, capsule, and portions of lens tissue—from remaining in the wound. In every step of the operation I have aimed at the greatest simplicity and accuracy of execution, in order to avoid all preventable accidents, to secure primary union of the wound, and ward

off, as much as possible, any kind of irritation in the healing process. Though I am convinced that the strict observance of these rules forms the fundamental conditions of success—the essential precautions—in the extraction of cataract, I have used antiseptic means in every other case of this series, yet in such a way that they could have no irritating effect on the delicate structures of the eye.

Usually a subsequent central division of the capsule was required to secure permanently good visual results. Thus far, I have not seen this operation do harm in any case.

In the after-treatment I have enjoined undisturbed rest as far as practicable.

The cases of the present series, like those of the former, were not selected in any way. They comprised all the patients presenting themselves to me for the cure of cataract, in whom I considered the method of extraction indicated, from May 19, 1881, until Nov. 8, 1882. As the results were better than those I have obtained in any previous series, and as I desire the reader to draw his own conclusions concerning the value of the different methods of operation and treatment, I will give, in a tabular arrangement, a synopsis of all the cases, so far as I have been able to follow them up. I add the names and addresses of the patients for I desire to state that I shall be thankful to those of my brother physicians who may be able and will be kind enough to complete my notes by any information on the later condition of any patient, particularly if it should not favorably compare with the statement made in the table. I request this favor not from fear that my veracity may be doubted, but because the value of medical statistics is in a certain degree lowered by the fact that the after-treatment, especially when the patient lives at some distance from the operator, is carried on by other physicians.

I. THE VISUAL RESULTS,

noted when the patients were examined for the last time, were as follows:

V $\frac{20}{20}$ in 7 cases
" $\frac{20}{30}$ " 10 "
" $\frac{20}{40}$ " 16 "
" $\frac{20}{50}$ " 15 "
" $\frac{20}{70}$ " 22 "
" $\frac{20}{100}$ " 9 "
" $\frac{20}{200}$ " 12 "

V $\frac{20}{200} - \frac{20}{20}$ in 90 cases.

V $\frac{8}{200}$ in 1 case
" $\frac{5}{200}$ " 2 cases
" $\frac{8}{200}$ " 1 case
" $\frac{10}{200}$ " 1 "
" $\frac{12}{200}$ " 1 "
" $\frac{16}{200}$ " 2 cases

V $\frac{8}{200} - \frac{15}{200}$ in 8 cases.

V $\frac{1}{\infty}$ in 2 cases.

Following the conventional designation, we have to record in the present series of 100 cases:

90 % of good results,
8 % of moderate results, and
2 % of failure.

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
1	M. Flick, Rondout, N. Y.	49	Good.	C. semimollis.	Apr. 19, 1881.	Large peripheric linear section.
2	Richard Wall, Brooklyn, N. Y.	70	Good.	Hypermature.	May 19, 1881.	Peripheric linear, small section; expulsion difficult; cornea collapsed.
3	Sarah Ryan, 424 5th Avenue, N. Y.	62	Good.	Dur. mat.	June 6, 1881.	Peripheric linear.
4	Mary O'Brien, New York.	70	Good.	Hypermature.	June 8, 1881.	Large peripheric section; zonula frail; *escape of vitreous.* Lens expelled by pressure with lids.
5	Samuel Herzog, 123 E. 84th Street, N.Y.	72	Debilitated.	E. very prominent. Cortex partially transparent.	Oct. 12, 1881.	Peripheric linear; *antisepsis.*
6	Mrs. Dwyer, Far Rockaway, N.Y.	60	Good.	C. semimollis.	Oct. 12, 1881.	Peripheric linear.
7	Malachi Kenney, Jersey City Heights.	58	Patient addicted to drink.	Semimollis.	Oct. 12, 1881.	Section angular; knife dull.
8	Mr. Waldmeyer, Jersey City Heights.	68	Good.	Semimollis.	Oct. 13, 1881.	Low flap along transparent corneal margin; edges in limbus; *antisepsis.*
9	Frank Hausheer, 186 Park Ave., Hoboken, N. J.	69	Feeble.	Dur. mat.	Oct. 14, 1881.	Low flap.
10	Mrs. M. Ayres, 20 W. 11th Street, N.Y.	64	Feeble	Hypermature; centre of capsule thickened.	Oct. 18, 1881.	*Antisepsis.*
11	Aug. Schwetge, Williamsburg, N. Y.	59	Good.	Hypermature.	Oct. 22, 1881.	Low flap.
12	Mrs. Kinike, Philadelphia, Pa.	76	Good.	Dur. mat.	Oct. 22, 1881.	Low flap; *antisepsis.*
13	William Walker, Binghamton, N. Y.	69	Good.	Dur. mat.	Oct. 26, 1881.	Low flap.
14	J. A. Cowing, 7 Broadway, N.Y. City.	65	Good.	Dur. mat.	Oct. 26, 1881.	*Antisepsis.*

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
Ruptured wound on seventh day. Hyphæma; well again in two days.	16	$\frac{20}{100}$	Discision a year later; no reaction.	5	$\frac{20}{20}$	——
Normal.	14	$\frac{20}{100}$	——	—		——
Normal.	17	$\frac{20}{20}$	Nov. 29, 1882. Division of capsule at her house; regular. Exposed to light the three first days. From the puncture in cornea a white streak to capsule; iritis for eight weeks, leaving one post. synechia, but a perfectly clear centre of the pupil. The white streak completely disappeared.	42	$\frac{20}{20}$	Six months after extraction, S $\frac{20}{20}$; eleven months later, $\frac{20}{100}$, from vertical wrinkling of capsule. The other eye, operated on by Dr. ——, was shrunken by irido-cyclitis.
Wound closed in first night; no reaction. *One filiform adhesion.*	14	$\frac{20}{20}$	——	—	$\frac{20}{20}$	——
Normal.	20	$\frac{20}{70}$	Jan. 6. Discision.	4	$\frac{20}{20}$	——
——	19	$\frac{20}{70}$	——	—	$\frac{20}{20}$	——
Ruptured wound on seventh day; half ant chamber filled with blood, followed by *capsulitis plastica.*	17	$\frac{20}{200}$	Dec. 15, 1881. Discision. Capsule not cut, but was detached from lower part of pupillary edge of iris and crowded above. Clear central pupil.	4	$\frac{20}{70}$	Six weeks after first discharge returned with thickened and striated capsule free from inflammation. S $\frac{20}{200}$.
No reaction.	16	$\frac{20}{70}$	Dec. 15, 1881. Discision.	3	$\frac{20}{20}$	——
On fifth day *spongy exudation*, slow in absorbing.	23	$\frac{1}{200}$	——	—	—	Patient mentally depressed, homesick; left before he was cured. The other eye operated at Institute before; success perfect.
Some lachrymation and congestion.	15	$\frac{20}{200}$	Dec. 3, 1881. Thickened capsule couched; no reaction. Pupil perfectly clear.	5	$\frac{20}{20}$	——
No reaction.	14	$\frac{20}{70}$	Dec. 12, 1881. Capsule divided with knife-needle; one dense band resisted; considerable stretching. Discharged, Dec. 29, 1881.	17	$\frac{20}{20}$	Returned Jan. 14th. Eye irritated. Healed slowly, but perfectly.
At the beginning of second week infiltration of outer corner of wound. Irido-capsulitis. Great pain. A small prolapse of iris in outer corner cut open and partially removed; forceps grasped it incompletely. Improved slowly; discharged with thickened capsule and partial adhesions.	34	$\frac{1}{200}$	Jan. 18, 1882. V=$\frac{1}{200}$. Division of capsule with knife-needle; no reaction.	5	$\frac{20}{20}$	A year later, vision excellent. Had no further discomfort.
No reaction.	15	$\frac{20}{100}$	——	—	$\frac{20}{20}$	——
On ninth day fell from his chair during a fainting spell; wound ruptured. A small *whitish infiltration at outer corner* ensued, but disappeared in a few days without specific treatment.	18	$\frac{20}{20}$	——	—	$\frac{20}{20}$	——

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
15	Mrs. Madden, 23 Elizabeth Street, N. Y. City.	62	Fat Woman.	C. dur. mat.	Oct. 28, 1881.	Low flap.
16	E. Hutton, Rondout, N. Y.	60	Good.	Semimollis.	Oct. 29, 1881.	Low flap; *antisepsis.*
17	Th. Kelly, 28 Elizabeth Street, N. Y. City.	58	Good.	Dur. mat.	Oct. 29, 1881.	Low flap.
18	Mr. Cotte, 100½ W. 25th Street, N. Y. City.	59	Good.	Dur. mat.	Oct. 29, 1881.	Low flap; *antisepsis.*
19	L. Kilsinger, Paterson, N. J.	66	Good.	Dur. mat.	Nov. 8, 1881.	Low flap; *antisepsis.*
20	Van Zandt, Plainfield, N. Y.	76	Good.	Hypermature.	Nov. 11, 1881.	Linear section, apex 2 *mm* in cornea; *antisepsis.*
21	J. Beck, Little Falls, N. Y.	60	Good.	Dur. mat.	Nov. 11, 1881.	Section curved along fully one third of upper transparent corneal margin, (*De Wecker's*). Iris cut with pinces-cisseaux.
22	Mrs. Vandenheufel, 106 E. 12th St., N. Y C.	82	Decrepit.	Pupil closed. Cat. accreta, *complicata*; old irido-choroiditis. Iridectomy four years previously. Other eye shrunken from irido-choroiditis.	Nov. 13, 1881.	Wecker's section; colobo-ma enlarged by excision of adjacent iris on both sides. Large peripheric opening of capsule. Exit of lens easy. *Antisepsis.*
23	M. McGowen, Boston, Mass.	58	Good.	C. hypermature, with thickening of centre of capsule	Nov. 15, 1881.	Wecker's section, with conjunctival flap.
24	Jac. Keller, Tom's River, N. J.	58	Good.	Dur. mat.	Nov. 17, 1881.	Wecker's section; no con-junctival flap; *antisepsis.*
25	Hannah E. Newkirk, 4 Vaness Pl., N. Y. C.	68	Good.	Pupil dilates in-sufficiently. Cat. Morgagnian.	Nov. 18, 1881.	Wecker's section. The iris was stroked out of the wound by spatula, so that a keyhole pupil was form-ed; yet, the cystotome, while passing through the upper edge of the capsule, caught hold of the stump of iris and dragged it along. The stump was exsected. Remainder of op. normal.
26	Kate Daly, 256 W. 29th St., N. Y. C.	32	Good.	Semimollis.	Nov. 18, 1881.	Wecker's section. *Anti-sepsis.*
27	Fanny Reutlinger, 200 Ave. A, N. Y. City.	64	Good.	Hard; ant. cham-ber shallow.	Nov. 21, 1881.	Wecker's section, with conjunctival flap, which par-tially lay in gaping wound, and had to be stroked out with bent probe. Patient very restless, pressing and incessantly moving her eye. Operation tedious, but without accident: expul-sion complete.
28	Katie Baldwin, 303 Fifth Ave., N. Y. C.	55	Good.	Semimollis.	Nov. 22, 1881.	Wecker's section, with con-junctival flap; *antisepsis.*
29	C. Hertlein, Carlstadt, N. J.	64	Good.	Dur. mat.	Nov. 30, 1881.	Wecker's section, with con-junctival flap, a portion of which engaged in wound and was stroked out with probe; *antisepsis.*

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	14	$\frac{20}{70}$	Discharged Dec. 20, 1881.	4	$\frac{20}{20}$	Other eye operated on by me 18 months previously. Lost by chronic iridocyclitis. V = $\frac{1}{\infty}$.
No reaction.	14	$\frac{20}{200}$	——	—	—	——
Wound closed slowly; in its centre a small piece of lens substance.	20	$\frac{20}{200}$	Dec. 13, 1881. Capsule adherent to scar, dotted and thickened; iris free. Discision produces large, central, perfectly clear pupil.	5	$\frac{20}{20}$	——
On sixth day, while kissing his wife, violently struck eye. Intense pain. Ant. chamber full of blood, which was absorbed in two days.	20	$\frac{20}{20}$	——	—	$\frac{20}{20}$	Some floating opacities in vitreous.
No reaction.	13	$\frac{20}{200}$	Dec. 16, 1881. V $\frac{20}{20}$. Discision.	5	$\frac{20}{20}$	——
Capsule in upper part thickened, in lower wrinkled.	15	$\frac{20}{70}$	Dec. 18, 1881. The whole capsule dislocated upward. Pupil central, beautifully clear.	4	$\frac{20}{20}$	——
No reaction.	14	$\frac{20}{20}$	——	—	—	——
No reaction.	20	$\frac{5}{200}$	Dec. 3, 1881. ⊥-shaped division of capsule.	5	$\frac{20}{200}$	Opacities of vitreous.
No reaction.	14	$\frac{20}{200}$	Dec. 12, 1881. Discision.	4	$\frac{20}{70}$	——
No reaction.	15	$\frac{15}{200}$	——	—	$\frac{20}{100}$	Some choroidal atrophy.
No reaction.	20	$\frac{20}{70}$	Jan. 9, 1882. Discision.	4	$\frac{20}{20}$	——
No reaction.	20	$\frac{20}{200}$	Dec. 9, 1881 (the twenty-first day). Discision.	4	$\frac{20}{20}$	——
No reaction, but healing slow.	30	$\frac{20}{100}$	——	—	—	——
No reaction.	14	$\frac{20}{70}$	——	—	—	——
No reaction.	18	$\frac{20}{70}$	——	—	—	Lost other eye by iridocyclit., after extraction made by me two years previously.

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cartaract.	Date of Operation.	Operation.
30	J. Nehrbas, 158 E. 85th St., N. Y.	47	Good.	Cataract complicated. Central corneal speck; floating opacities in vitreous.	Nov. 29, 1881.	Low flap.
31	Hugh Rooney, Poughkeepsie, N. Y.	48	Good.	Cataract. luxata traumat.	Dec. 10, 1881.	Low flap; *Escape of vitreous*; no iridectomy; iris fallen back; *antisepsis.*
32	H. Ehrsam, Bridgeport, Conn.	43	Good.	Cataract Morgag. Centre of capsule thickened.	Dec. 11, 1881.	Low flap. Large amount of milky substance, exit of nucleus without pressure, followed by stream of tears.
33	Mrs. C. Wiedenmeyer, 538 9th Ave., N. Y.	51	Good.	Dur. mat. complicata; opacities of cornea; adherent lecucoma.	Dec. 12, 1881.	By mistake the back of the knife was directed upward. When the counter-puncture was made and the point of the knife was 5 *mm.* beyond it, the knife was turned on its axis, and the section completed as usual. After the expulsion of the lens, iris protruded at both corners; the greater protrusion in one was cut off, the smaller in the other reduced by spatula. Application of wound perfect.
34	Maria Joyce, 14 Spring St., N. Y.	48	Good.	Semimollis.	Dec. 14, 1881.	Wecker's section. Large iridectomy. Capsule ripped open by curved knife-needle from centre of section toward both corners; *antisepsis.*
35	Mrs. C. Capen, Cornwall, N. Y.	61	Feeble.	Dur. mat.	Dec. 15, 1881.	Small section. T incision of capsule, first the vertical. The horizontal, with cystome, from both corners toward the centre.
36	J. Purger, 330 E. 21st St., N. Y.	73	Feeble.	Lens dislocated in ant. chamber; traumatic.	Dec. 20, 1881.	*Loss of vitreous.* Iris tilted back.
37	Mrs. S. Simonds, Detroit, Mich.	63	Obesity.	Dur. mat.	Dec. 30, 1881.	Wecker's section, T shaped cystotomy; *antisepsis.*
38	Jos. Coons, Wilkesbarre, Pa.	64	—	Dur. mat.	Dec. 30, 1881.	Wecker's section.

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	13	$\frac{8}{200}$	——	—	—	Other eye operated on in 1879. V = $\frac{6}{18}$.
A prolapse of iris, which showed two days after the operation was removed. Plastic iritis. Closure of pupil.	24	$\frac{1}{200}$	Iridectomy downward.	7	$\frac{10}{200}$	——
Upper part of coloboma occupied by whitish substance. From the sixth to the fifteenth day irritation; muco-purulent secretion, upper lid and conjunctiva swollen. Wound clean, ant. chamb. clear. The eye and conjunctival sac are frequently washed out with tepid salt water.	18	$\frac{20}{200}$	——	—	—	——
Striped keratitis, disappearing as usual. No reaction.	14	$\frac{8}{200}$	——	—	$\frac{8}{200}$	——
Circumcorneal injection. Three *filiform adhesions:* one at each sphincter edge, one below.	14	$\frac{20}{20}$	——	—	$\frac{20}{20}$	——
Attacks of syncope, to which she is subject. Iritic irritation; no adhesions.	20	$\frac{20}{20}$	——	—	$\frac{20}{20}$	——
Prolapse of iris on second day; cut on fourth day. Dense pupillary membrane.	25	$\frac{5}{10}$	Iridectomy.	6	$\frac{12}{100}$	——
A tongue-like white streak extended from the vicinity of the inner cornea 4-5 *mm.* down. Iritic reaction. Capsule thickened; no synechiæ.	34	$\frac{12}{100}$	May 15, 1882. A vertical white streak from basis of coloboma to centre of free and movable pupil; wrinkles of capsule radiating from central streak. V $\frac{20}{100}$. Discision. Puncture in lower part of cornea; capsule split obliquely from above and in to below and out; then a second time from above and out to below and in, meeting the other at its lower part; then the lower end of the white cord was put before the edge of the scalpel-needle and cut through.	6	$\frac{20}{70}$	——
No reaction.	19	$\frac{20}{100}$	Three months later, Discision.	5	$\frac{20}{20}$	——

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
39	Mr. Hodge, D.D.S., Binghamton, N. Y.	52	Very nervous.	Dur. mat.	Jan. 19, 1882.	Wecker's section. *Antisepsis*; anesthesia. Remnants of cortex.
40	Mrs. A. Kalb, 257 Ave. C, N. Y. City.	57	Good.	Dur. mat.	Jan. 26, 1882.	Low flap. Ether. *Antisepsis.*
41	Mrs. A. Kalb, 257 Ave. C, N. Y. City.	57	Good.	Hypermature.	Jan. 26, 1882.	Peripheric linear, immediately after extraction of the other. *Antisepsis.*
42	Fr. Kaul, 150 E. Houston St., N.Y.	62	Good.	Dur. mat.	Jan. 26, 1882.	Peripheric linear.
43	Mrs. Marah, New Brunswick, N. J.	66	Good.	Hypermature. Capsule opaque.	Feb. 21, 1882.	Moderately high flap. *Antisepsis.*
44	Mrs. C. Paul, Williamsburg, N. Y.	74	Feeble.	Dur. mat.	Feb. 24, 1882.	Low flap; *antisepsis.* Patient unruly; a considerable quantity of cortex wiped out with lids.
45	A. McGraw, 130 Norfolk St., N. Y.	50	Feeble.	Dur. mat.	Feb. 24, 1882.	Wecker's section. *Antisepsis.*
46	Mrs. Jarvis, Binghamton, N. Y.	55	Fair.	Cat. compli., immature. Excessive myopia.	Mar. 9, 1882.	Wecker's section.
47	Aug. Hipp, Williamsburg, N. Y.	31	Good.	Soft.	Mar. 9, 1882.	Small linear section in cornea.
48	Mrs. Engle, Carbonville, Pa.	56	Good.	Morgagnian.	Mar. 16, 1882.	Wecker's section. *Antisepsis.*
49	S. Rosenfeld, 1112 2d Ave., N. Y.	74	Moderate.	Dur. mat. Capsule dotted.	Mar. 20, 1882.	Wecker's section.
50	Miss C. C. Bonner, Belvedere, Allegheny Co., Pa.	70	Good.	Dur. mat. Cortex whitish, not entirely opaque.	Mar. 21, 1882.	Graefe's peripheric linear; apex in transparent margin, ends beyond. Expulsion of lens easy, but removal of cortex requiring *prolonged rubbing* with lids. Iris in inner corner stroked back; some conjunctiva pushed in, brought out with probe. The clearing of the pupil and adjustment of iris and conjunctiva done by oblique light.
51	A. Günther, 338 E. 6th St., N.Y.City.	60	Weak.	Cat. dur. with transparent parts of cortex.	Mch.24, 1882.	Low flap; nucleus and cortex expelled as one mass by spoon pressing on lower edge of cornea.
52	E. Doran, Yonkers, N. Y.	50	Good.	Hypermat.; centre of capsule thickened.	March 28, 1882.	Wecker's sect. Thorough *antisepsis.*
53	J. Field, New Brighton, N. Y.	45	Good.	Cat. dura, fere mat.	March 28, 1882.	Wecker's section.
54	A. Mudge, Cornellsville, N. Y.	59	Good.	Morgagn.	Apr. 5, 1882.	Wecker's section. *Antisepsis.*

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	18	20/100	Sept. 28, 1882. Discision.	5	20/40	——
No reaction.	18	20/30	——	—	—	——
No reaction.	18	20/30	——	—	—	——
No reaction.	20	20/40	——	—	—	——
No reaction.	21	20/100	March 7, 1882. Horizontal division of capsule.	4	20/70	——
Patient restless. Congestion of iris. No adhesion. Capsule wrinkled and cloudy.	19	20/200	May 17, 1882. Discision.	4	20/30	——
No reaction.	14	20/200	——	—	20/40	Two months later, capsule perfectly clear.
No reaction.	23	2/200	March 26, 1882. Discision of opaque capsule. Pupil small, horizontally slit-shaped.	5	2/200 20/200	Most extensive choroidal atrophy. Opacity of vitreous considerable. News received nine months later, states that vision has greatly improved, and patient can read comfortably.
No reaction.	18	20/70	——	—	—	——
No reaction.	19	20/200	April 3, 1882. Discision.	6	20/30	——
No reaction.	15	20/200	Oct. 26, 1882. Discision. Needle was entered twice to cut a band.	5	20/40	——
Panophthalmitis, beginning with pain in first night; increased second day; iris at both corners of wound whitish, infiltrated; then centre of flap. Third day a remisssion. Pus covered iris; left pupil free. The fourth day vitreous protruding, streaked; then ordinary course of panophthalmitis.	27	1/∞	——	—	—	I attribute the loss of this eye to *prolonged manipulation*. There was no antisepsis employed, but the eye carefully cleansed before and in good condition. I had no dispensary on that day, but operated after coming from my office.
No reaction.	19	20/70	——	—	—	——
From fifth day capsulitis for six weeks; pain at night; swelling of edge of upper lid; marked circumcorneal injection; whitish discoloration of centre of corneal lip of section, disappearing in four days. Upper part of coloboma free, lower occupied by white puriform substance within capsule; synechiæ at lower part of pupil. Counted fingers through upper part all the time. Capsulo-iritis.	46	1/200	May 6, 1882. Discision of upper part of capsule.	5	20/200	——
No reaction.	15	20/30	Nov. 28, 1882. Discision.	4	20/30	——
No reaction.	12	20/30	——	—	—	——

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
55	J. Garvey, 442 Avenue C, N. Y.	60	Good.	Dur. mat.	Apr. 14, 1882.	Wecker's section.
56	L. Weeks, Patchogue, N. Y.	74	Good.	Hypermat. accreta.	——	Wecker's section. *Antisepsis.*
57	M. Fick, Rondout, N. Y.	50	Good.	Semimollis.	Apr. 20, 1882.	Regular peripheric linear. Considerable bleeding.
58	J. Starrs, Anderson Co., Tenn.	60	Good.	Margagnian complicated.	Apr. 25, 1882.	Wecker's section with conjunctival flap. *Antisepsis.*
59	K. Bauer, 124 Allen St., N. Y.	50	Good.	Dur. mat.	Apr. 27, 1882.	Wecker's section.
60	A. Siffken, Brooklyn, N. Y.	40	Good.	Semimollis, complic., traumatica; partially shrunken from foreign body still in eye.	Apr. 27, 1882.	Wecker's section; expulsion somewhat difficult, followed by a *drop of vitreous. Antisepsis.*
61	J. Doyle, 248 Hudson St., N. Y.	38	Good.	Mollis traumat.	May 2, 1882.	Wecker's section.
62	L. Chiverton, 442 W. 31st St.. N. Y.	69	Weak.	Dur. mat.	May 8, 1882.	Wecker's section. *Antisepsis.*
63	A. Bietz, Jeffersonville, N. Y.	60	Good.	Dur. mat.	May 9, 1882.	Wecker's section.
64	W. N. Townsend, 437 Gouverneur st., Newark, N. J.	48	Good.	Dur. mat.	May 23, 1882.	Wecker's section. *Antisepsis.*
65	K. Fleming, 232 W. 28th St., N. Y.	38	Good.	C. mollis.	June 1, 1882.	Wecker's section. *Antisepsis.*
66	D. A. Dieck, 358 W. 18th St., N. Y.	64	Good.	Morgagnian.	June 1, 1882.	Wecker's section.
67	R. Wall.	60	Feeble.	Dur., mat., complicata; pupil does not dilate with atropine. Synchysis. Conjunctivitis catarrh.	June 2, 1882.	Wecker's section. After cystotomy a bead of vitreous presented. Lens expelled by holding post. lip back with a spoon, and pressing lower part of cornea with another. On inspecting the eye 5 min. later, a drop of fluid *vitreous escaped. Antiseptic* dressing.
68	P. Kelly.	60	Good.	Dur. mat.	June 8, 1882,	*Escape of vitreous* with cataract by excessive pressure. Dressing with absorbent cotton.
69	D. Hodge, Binghamton, N. Y.	55	Nervous.	Dur. mat.	June 10, 1882.	Ether. Spray. Carbolized dressing.
70	D. Callahan, 122 Madison St., N. Y.	60	Good.	Morgagn. complicata. Iris atrophic.	June 10, 1882.	Patient being unruly, a small piece of iris in corner of wound not removed. Thorough *antisepsis.*
71	Dr. E. Hall, 17 E. 66th St., N. Y.	62	Good.	Morgagn. cholesterinic.	June 12, 1882.	Wecker's section.
72	Mrs. J. Hughes, Tompkinsville, N. Y.	62	Good.	Dur. mat.	June 20, 1882.	Wecker's section.
73	Mrs. A. Feldhusen, 155 Seventh Ave., N.Y.	68	Good.	Dur. mat.	June 22, 1882.	Wecker's section. *Antisepsis.*
74	J. Bretz, 284 Second St., N. Y.	57	Good.	Dur. mat.	June 22, 1882.	Wecker's section. Expulsion of lens laborious.
75	Mrs. M. Thiele, 405 Ninth Ave., N. Y.	44	Good.	Dur. mat. (Complicated.)	June 27, 1882.	Wecker's section. Lens pressed out with fingers and lid, after removal of speculum.
76	M. Doyle.	41	Nervous.	Hypermat. compl., subluxata (iridodonesis.)	Aug. 15, 1882.	Wecker's section. Iridectomy difficult on account of excitability of patient. Speculum removed. Lens squeezed out in capsule with fingers and lids.

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	15	20/100	——	—	—	——
No reaction.	14	20/100	——	—	—	——
No reaction.	15	20/70	——	—	—	——
No reaction.	14	20/70	——	—	—	——
No reaction.	16	20/70	——	—	—	——
No reaction.	25	20/200	——	—	20/200	Six years ago a small piece of steel entered the eye, causing the cataract. No irritation. Eight weeks after extr. numerous retinal hemorrhages occurred; disappeared, leaving the eye quiet and good. Foreign body not discovered.
No reaction.	20	20/100	——	—	—	——
No reaction. Slow closure of wound.	31	20/100	——	—	—	——
No reaction.	15	20/100	——	—	—	——
No reaction.	14	20/200	June 16, 1882. Discision.	4	20/40	——
No reaction.	14	20/70	——	—	—	——
No reaction.	14	20/40	——	—	—	——
Circumcorneal injection moderate. No adhesions.	19	1/200	June 21, 1882. Discision. Needle entered twice to cut a resisting band.	5	20/100	Eye treated for a few days with a one to two per cent. solution of carbolic acid.
No reaction.	18	20/70	——	—	20/70	——
No reaction.	18	20/100	June 28, 1882. Discis.	5	20/40	——
Pain; lachrymation; protrusion of iris raising the flap. Closure of pupil by *irido-cyclitis*.	30	1/6 or 1/1000	——	—	1/6	Patient, whose other eye had been operated on a year before, was careless and uncontrollable, thinking all precautions superfluous.
No reaction.	15	20/40	——	—	20/40	——
No reaction.	21	20/200	Sept. 19, 1882. Discis. crucial.	5	20/100 at dis.	Pupil clear. Vitreous hazy.
No reaction.	16	20/200	——	—	20/40	——
No reaction.	14	20/70	——	—	20/40	——
No reaction.	18	20/200	Aug. 22, 1882. Discision.	5	20/70	Floating opacities of vitreous.
No reaction.	20	20/200	——	—	20/200	Floating opacities of vitreous.

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
77	Mrs. W. Ellrich, Plainsville, Conn.	61	Fair.	Dur. mat.	Aug. 19 1882.	Wecker's section. Patient restless, pressing. After cystotomy, speculum removed. Lens pressed out with fingers.
78	Mrs. L. Albinus, 618 E. 9th St., N. Y.	60	Good.	Morgagnian, complicated, subluxated.	Aug. 22, 1882.	After section lens proved dislocated downward. Vitreous presented; iris tilted back. Speculum removed. Lens in capsule pressed out with fingers. Slight *loss of vitreous.*
79	A. Spengler, 65 Forsyth St., N. Y.	64	Fair.	Hypermat. disciform; capsule thickened.	Aug. 23, 1882.	Wecker's section. *Antisepsis.*
80	J. Bassy, 306 Varick St., N. Y.	72	Feeble.	Hypermat.; ant. capsule thickened, and whole cortex pervaded with many chalky-looking dots.	Aug. 23, 1882.	Wecker's section. Broad iridectomy. Speculum removed. Lens squeezed out in capsule with considerable *loss of vitreous.*
81	Mrs. Mauer, 1058 Third Ave., N. Y.	67	Good.	Dur. mat.	Aug. 24, 1882.	Wecker's section.
82	John Ames, 525 W. 49th St., N. Y.	78	Debilitated. Stricture of urethra. Hematuria.	Dur. mat.	Sep. 13, 1882.	Wecker's section. *Antisepsis.*
83	Mrs. Dunn, Stockholm, N. J.	25	Weak. A great quantity of sugar in urine.	Diabetic.	Sep. 15, 1882.	Wecker's section. *Antisepsis.*
84	Miss K. Daly, 526 W. 29th St., N. Y.	33	Good.	Dur. mat.	Oct. 5, 1882.	Wecker's section.
85	Mrs. D. Schuhmacher, Hurleyville, N. Y.	66	Fair.	Hypermat., complic.	Oct. 5, 1882.	Wecker's section. *Antis.* Cortex left.
86	A. Hilton, Andes, N. Y.	73	Good.	Dur. mat.	Oct. 5. 1882.	Wecker's section.
87	J. Field, New Brighton, N. Y.	45	Good.	Dur. mat.	Oct. 7, 1882.	Wecker's section.
88	L. Rosenstock, 191 First Ave., N. Y.	67	Good.	Dur. mat. Mac. corneæ old, from trachoma.	Oct. 9, 1882.	Wecker's section.
89	J. F. Purdy, 20 Fifth Ave., N. Y.	70	Eczema, chronic, of face.	Dur. mat.	Oct. 9, 1882.	Wecker's section. *Antisepsis.*
90	Mrs. M. Dodge, Garden City, N. Y.	62	Good.	Dur. mat.	Oct. 10, 1882.	Wecker's section. *Antisepsis.*
91	R. C. Burlage, 412 Pacific St., Brooklyn, N. Y.	74	Good.	Morgagn.	Oct. 11, 1882.	Wecker's section.
92	Miss Sheldon, Warren, N. Y.	66	Good.	Dur. mat.	Oct. 12, 1882.	Wecker's section.
93	A. C. Hawes, D. D. C., N. Y.	68	Good.	Dur. mat.	Oct. 12, 1882.	Wecker's section.
94	Mrs. Kane, 12 WashingtonPl., N.Y.	64	Good.	Dur. mat.	Oct. 19, 1882.	Wecker's section. *Antisepsis.*

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	14	$\frac{20}{200}$	Oct. 4, 1882. Discision.	5	$\frac{20}{20}$	——
Outer part of wound gaping by a small bead of vitreous. Closed. Prolapse of iris in outer corner.	21	$\frac{20}{200}$	——	—	$\frac{20}{200}$	——
No reaction.	20	$\frac{1}{200}$	Sept. 19, 1882. Discis. A clear central opening in thickened capsule.	5	$\frac{20}{70}$	——
No reaction for a week; then muco-purulent secretion; slight turbidity of ant. chamber; wound long open by intrusion of vitreous, finally closed regularly; no synechiæ. Treatment: careful cleansing; compressive bandage; atropine.	30	$\frac{20}{200}$	——	—	$\frac{20}{200}$	Considerable opacities of vitreous seen later.
No reaction.	19	$\frac{20}{70}$	——	—	$\frac{20}{70}$	——
Spongy erudation on fourth day, having contracted so as to fill pupil only, when he left. Had a severe attack of hematuria to which he was subject. Died four days after he had gone home.	7	Could not be tested accurately.	——	—	$\frac{1}{200}$	The eye being in a good condition, the operation would have given a good visual result.
No reaction.	12	$\frac{20}{70}$	——	—	—	Was well on 27th and to be discharged. Husband was prevented from taking her home. She had diabetic coma on the 28th, from which she died on the 29th.
No reaction.	14	$\frac{20}{70}$	——	—	—	——
No reaction.	16	$\frac{1}{200}$	Oct. 19, 1882. Discision. Central clear pupil.	5	$\frac{20}{20}$	——
Two filiform adhesions.	14	$\frac{20}{70}$	——	—	—	——
No reaction.	14	$\frac{20}{30}$	Nov. 28, 1882. Discision in both eyes.	5	$\frac{20}{20}$ in each.	——
No reaction.	14	$\frac{20}{200}$	——	—	$\frac{20}{70}$	——
No reaction.	12	$\frac{20}{70}$	Nov. 10, 1882. Discision. Slight reaction. A small string of mucoid vitreous projected from the stitch canal in cornea, after abscision of which all reaction disappeared; large, clear pupil.	5	$\frac{20}{20}$	——
No reaction.	14	$\frac{20}{200}$	Dec. 18, 1882. Discision.	4	$\frac{20}{20}$	——
No reaction.	14	$\frac{20}{200}$	Nov. 28, 1882. Discis.	4	$\frac{20}{20}$	——
No reaction.	15	$\frac{20}{20}$	——	—	$\frac{20}{20}$	——
No reaction.	15	$\frac{20}{70}$	——	—	$\frac{20}{20}$	——
No reaction.	14	$\frac{20}{20}$	——	—	—	——

No.	Name and Address.	Age.	General Health.	Condition of Eye and Cataract.	Date of Operation.	Operation.
95	J. Bubach, 182 Orchard St., N. Y.	54	Good.	Dur. fere mat.	Oct. 27, 1882.	Wecker's section. Cortex left.
96	Mrs. C. Guldenkirch, 188 Avenue B., N. Y.	50	Good.	Dur. mat.	Oct. 30, 1882.	Wecker's section.
97	Mrs. Small, Presby. Home, N. Y.	73	Feeble.	Hypermat.	Nov. 6, 1882.	Wecker's section. *Antisepsis.*
98	Mrs. Williams, 406 W. 29th St., N. Y.	60	Good.	Dur. mat.	Nov. 6, 1882.	Wecker's section. *Antisepsis.*
99	Mrs. A. McLevy, 655 W. 42d St., N. Y.	65	Good.	Dur. mat.	Nov. 7, 1882.	Wecker's section.
100	Mrs. B. Gurges, 2301 Second Ave., N. Y.	44	Good.	Dur. mat. complicata. Yellowish stellate nucleus.	Nov. 8, 1882.	After completion of section a large bead of vitreous presented. Speculum at once removed. Eye closed several minutes. Iridectomy. Lens squeezed out in capsule with fingers and lids; adhered at lower part; had to be scooped off with silver spoon. No escape of vitreous.

II.—THE AGE

of the patients, with the results of the operations, is shown by the following table.

Years.	Number of Operations.	Results.		
		Good.	Moderate.	Failure.
25	1	1		
30–39	5	5		
40–49	12	10	2	
50–59	23	21	2	
60–69	43	40	2	1
70–79	15	12	2	1
80–89	1	1		
	100	90	8	2

Course of Healing.	Length of Treatment.	Primary Vision.	Secondary Operation.	Length of Treatment.	Ultimate Vision.	Remarks.
No reaction.	15	$\frac{15}{200}$	——	—	—	Discision will give full sight.
No reaction.	17	$\frac{20}{70}$	Jan. 12, 1883. Discis.	4	$\frac{20}{30}$	——
No reaction.	14	$\frac{20}{200}$	——	—	—	——
No reaction.	14	$\frac{20}{100}$	——	—	—	——
No reaction.	14	$\frac{20}{100}$	Dec. 18, 1882. Discision, perfectly smooth. No reaction.	5	$\frac{15}{200}$	About four days before she entered the hospital again, noticed that she saw things only half; did not mention it until several days after the second operation, when F. was found contracted on nasal side. OS. Retina detached outward and below. The detachment was probably of traumatic origin; the patient tells a different story, as often as she comes.
Considerable pain and flashes of light the first night. Afterward no reaction.	19	$\frac{20}{100}$	——	—	—	——

Referring to the synopsis of cases, we find that, below the age of forty-seven years, there was no failure and no half success. After that age the incomplete successes and failures increase in numbers as the years advance. Apart from any prejudicial influence of old age on the recovery from the operation, this cannot be otherwise in a series of unselected cases, for we may expect that an equal number of eyes between the age of sixty and eighty years will show a greater number of complications than between forty and sixty years, and will lower the rate of success proportionately.

III.—THE GENERAL HEALTH

of the patients showed its influence in several cases of this series, which deserve particular mention.

Case No. 7 was a stout, **plethoric man, addicted to drink.** He was very restless, ruptured the well-closed wound on the seventh

day, which was followed by considerable hemorrhage in the anterior chamber, and obstruction of the pupil by capsulo-iritis. V $\frac{6}{100}$ was, however, by a subsequent successful discision of the capsule, raised to $\frac{6}{10}$.

Case No. 9 was a feeble man of sixty-nine years of age. On the fifth day a spongy exudation filled the anterior chamber, was slow in absorbing, and still filled the pupil when, twenty-three days after the extraction, the patient left the hospital, counting fingers only near by. He was **mentally depressed and homesick**. As the other eye had been operated on a year previously, and was very good, he did not care much about the second eye, and, though asked by letter, has not been heard from since.

Case No. 81 was a debilitated gentleman of seventy-eight years, who for years had suffered from the consequences of a urethral stricture. Of late severe spasmodic attacks of **hematuria** had occurred repeatedly, but always were over in a few days. He was operated on in Sept., 1882, feeling quite well. The wound closed in the first night, and the recovery progressed undisturbedly until the fourth day when spongy exudation was noticed in the anterior chamber. It caused no pain and only slight circumcorneal injection ; the absorption soon began and advanced regularly. In the night of the eighth day he had a new attack of hematuria, more severe than any he had had previously, and gave him such excruciating pain that he wished to consult his family physician, and, if possible, to be treated in his own house in the city. As the eye was in a good condition, I could have no objection to his removal, which accordingly was done in the evening of the eighth day. He died four days later. When he left the Institute the exudation still filled the pupil, but the anterior chamber had become clear, the iris was bright, and his vision, though it could not be tested with any degree of accuracy, was put down as $\frac{6}{200}$, but would, undoubtedly, have become quite good after the absorption of the rest of the fibrinous exudation.

Case No. 82 referred to a married woman of twenty-five years of age, who was very much reduced by **diabetes mellitus**. She had become so blind that she had only quantitative perception of light in each eye. Though her urine contained a large quantity of albumen, I extracted the cataract from one eye. The recovery was perfectly smooth, and on the eleventh day her husband was sent for to take her home, the eye being white and free from reaction, her sight good, $\frac{6}{10}$. Her husband, a workingman

in New Jersey, was very busy and did not come. On the thirteenth day she felt languid, in the night she became somnolent, and died of **diabetic coma,** in the hospital, on the fourteenth day.

These cases show that the healing process after the present method of extraction is not materially influenced even by very unfavorable conditions of the patient's general health.

IV—THE CHARACTER OF THE CATARACT

with its influence on the operation, the course of healing, and the visual result, is seen in the following table:

Character of Cataract.	Number of Operations.	Operation.		Recovery.		Visual Result.		
		Smooth.	With Accidents.	Kind.	Disturbed.	Good.	Moderate.	Failure.
Mature	58	56	2	47	11	55	3	
Immature	5	5		4	1	3	1	1
Hypermature	20	18	2	18	2	20		
Complicated	17	11	6	14	3	12	4	1
Total	100	90	10	83	17	90	8	2

a.—Mature cataracts.

The two **accidents** which occurred in the 58 operations made for mature cataract, were:

1. *A small piece of lens left in the centre of the wound.* It may have been so transparent as to escape detection during the operation, or it may have lodged itself there later, when, by a casual opening of the wound, the aqueous escaped, carrying with it particles situated in the anterior chamber. It produced, in this case, a slow closure of the wound, but no irritation.

2. *Escape of vitreous* immediately after the expulsion of the lens. The cause was excessive pressure on the part of

the patient. This is the only case in the whole series where prolapse of vitreous occurred as an accident which might have been prevented, either by removing the speculum during the last act of the operation, and expelling the lens by outward pressure with the lid or spoon, or by anæsthetizing the patient. As the operation was otherwise smooth, it had no bad influence on the recovery.

Among the **reactive processes** the following are noted:

1. Two cases of *hyphæma.*
2. *Reopening of wound* in one case.
3. *Slow closure of wound* in one case.
4. *Traumatic infiltration of wound* in one case (No. 14).
5. *Spongy exudation* in two cases (Nos. 9 and 82).
6. *Filiform adhesions* in one case.
7. *Partial kerato-iritis* in one case (No. 37).
8. *Irido-capsulitis* in one case (No. 12), either from primary or secondary incarceration of iris in one corner of the wound.
9. *Detachment of the retina* in one case (No. 99). As the healing both of the primary and secondary operation was undisturbed, it is possible that the detachment was present or imminent before.

The *visual result* in all these cases was good, except in the two of spongy iritis, which left the institution before the absorption was complete.

b.—Immature cataracts.

I have been less afraid of operating on cataracts not perfectly ripe than I was formerly, because the remnants of lens, when the capsule is opened only at the periphery, are shut off from the anterior chamber and remain harmless in the capsular bag. They may give an insufficient primary visual result, as in case 95 of this series, but the ultimate result is good either by their spontaneous absorption or subsequent central division of the capsule. In one case (No. 50), where the immediate visual result was insufficient, I was led to clear the pupillary area by prolonged rubbing with the lids. I succeeded in clearing the pupil, but primary suppuration—the only instance of the whole series—destroyed the eye.

In spite of what I said above, I still adhere to the rule that immature cataracts should be removed only on forcible reasons of opportunity.

c.—Hypermature cataracts.

As in the preceding series, so in this, have the hypermature cataracts yielded the best results; the vision, in all of them, becoming good.

The **accidents** which occurred in two casss were limited *prolapse of vitreous.* In both, the zonula was frail and the lens was pressed out with the lids—in the first after opening the capsule, in the second together with the unbroken capsule. No reaction in either.

Two cases showed irritative **reactive processes**. In one (No. 32), a whitish exudation made its appearance in the upper part of the wound, accompanied by chemosis, swelling of the upper lid, and considerable muco-purulent discharge. The eye recovered under no other treatment than careful washing with lukewarm salt water.

In the other case (No. 52), the centre of the capsule was white and thickened. It occupied the natural pupil; on the fifth day irritation set in:—pain, circumcorneal injection, a whitish-yellow substance enclosed in the capsule at the lower part of the pupil, the upper part remaining black; synechiæ to capsule at lower part, in short—*purulent capsulo-iritis* which lasted six weeks. At the beginning of this process the centre of the corneal lip of the wound became somewhat whitish, but cleared up completely in four days. The eye was carefully watched and cleansed; the capsule was wrinkled in the upper part, obstructed in the lower by a dense white substance. V $\frac{4}{200}$ was raised by a subsequent discision to $\frac{20}{200}$.

d.—Complicated cataracts.

There were in this series, seventeen cases of manifestly complicated cataracts. The **accidents** encountered during the operation on them were:

1. Small *prolapse of iris* in a corner of the wound (case No. 70). The patient had an atrophic iris, Morgagnian

cataract, and was so unruly that I could not remove the small prolapse. Irido-cyclitis ensued with total closure of the pupil. S $\frac{1}{\infty}$ (entered as a failure).

2. *Escape of vitreous* in five cases. In two (Nos. 31 and 35) the lens was dislocated in the anterior chamber. In the third (No. 60) the cataract was shrunken, and had been produced by a foreign body, still in the eye. In the fourth (No. 67) the iris was atrophic, the pupil immovable. After the opening of the capsule a bead of vitreous presented; the speculum was removed, the lens expelled by pressure with the lids, followed by a drop of vitreous. In the fifth the lens was squeezed out with the lids in its capsule. The recovery in all these cases, except in the one with irido-cyclitis, was satisfactory, and the sight as good as the condition of the eye before the operation warranted.

V.—METHOD OF OPERATING.

The *section* in the first cases was a linear incision, the end-points about 1 *mm.* in the limbus, the apex in the transparent cornea, near the upper end of the vertical meridian. Gradually, however, I shifted into the circular-marginal section of de Wecker. The latter has the advantage over the former that its end-points are less near the insertion of the iris and opens more readily, which renders angular processes: bruising and incarceration, less frequent and less intense. My experience has shown me, against my expectation, that it heals equally well as the linear section.

The *iridectomy* was made smaller than formerly in cases of healthy, not thickened capsule, for experience has shown that a smaller opening in the capsule in such cases is easily enlarged by the lens during its exit, without causing unpleasant complications.

The *opening of the capsule* was peripheric in all cases: a clean incision with the needle-cystotome. In a few cases I added a longer vertical incision, but soon gave it up, finding that the vertical incision was sometimes followed by a linear thickening (scar) in the centre of the capsule, from which a system of small folds radiated in every direction through the remainder of the capsule. It did not obviate an after-

operation, on the contrary made it more necessary and more difficult. The addition of a short vertical incision to the horizontal, which I practised in the beginning, has not proved of especial value in any kind of cataract, so that I now confine myself to the horizontal incision, leaving all optical imperfections in the pupillary area to be dealt with by the after-operation. A sufficient corneal section, a clean iridectomy, an incision of the capsule along the corneal section, constitute this comparatively simple operative procedure, which admits of an easy expulsion of the lens. The expulsion was commonly effected in the usual manner by pressing with a spoon on the lower segment of the cornea. In irritable patients and complicated cataracts I removed the speculum, and pressed the lens out with the lid or the spoon. This latter procedure was resorted to, and always successfully, in those cases of hypermature and complicated cataracts, in which I wanted to remove the lens within the unopened capsule.

Particular care was taken to have the **wound perfectly free from foreign substances:** conjunctiva, iris, capsule, lens. Whenever there was any suspicion of such substances lying in the wound, the eye was examined by oblique illumination, and the necessary measures taken. I may here say that for many years I have had artificial light ready at every cataract-operation. When the day was dark, or I was kept too long in the dispensary, I made the whole extraction by artificial light. I perform all cataract-extractions in the rooms of the patients, and a drop-light with an Argand gas-burner and a large hand-lens are always ready. Frequently I concentrate with the hand-lens the daylight on the eye. I mention these particulars with reference to Dr. De Wecker's recent recommendation to perform the last steps of extraction under all circumstances by artificial light. This I have not found necessary. An indispensable condition of performing a cataract-extraction correctly, is to see well, but this is the case in good daylight which, if present, is not only sufficient, but also very convenient in performing extraction. The necessity of a special lamp, as Wecker recommends, has not shown itself to me, for I had always

skilled assistants at my disposal, who threw the cone of light exactly where I wanted it. The most delicate manœuvre of the whole operation is the division of the capsule, which should not be made without good illumination by day or lamp light. The secondary division of the capsule I never attempt to do without artificial oblique illumination. These are the same rules which I made known as early as 1868,[1] and have observed ever since.

The cleansing of the wound is, as everybody knows, of the utmost importance; yet too much may be done in that line. I have in this whole series of operations avoided as much as possible passing probes or spatulas through or even into the wound, as rubbing with the lids commonly fulfils that purpose well enough, reducing even portions of iris which may have engaged in the corners of the wound. If rubbing and gentle pressure on the cornea failed to reduce the iris, it was either seized with forceps and cut off, or reduced with a blunt spatula or probe.

In every case I have endeavored to use all precautions to obtain primary union. In about half of them I have used antiseptic procedures. A spray of a 3-per-cent. to 5-per-cent. solution of carbolic acid was employed in the corresponding part of the room several minutes before the operation in order to purify the atmosphere. During the operation spray was never thrown on the patient's face, but on his body and on that of the operator and assistants, whose hands had been washed with a 3-per-cent. solution of carbolic acid. The patient's face and his hair near the eye were washed with a 2-per-cent. solution of carbolic acid, the eyelids and brow very carefully. The conjunctival sac was washed out with solutions of boracic acid, chloride of sodium, or some other salt in a weak solution, one quarter hour or longer before the operation. Immediately before operating I never put any thing in the conjunctival sac, so as to avoid all congestion from that cause. In a few of the operations, the instruments were placed in a 2-per-cent. solution of carbolic acid, but I relinquished that precaution very soon, as it

[1] *Graefe's Archives*, vol. xiv, 1, pp. 262-266. The advantage of artificial illumination in operations for secondary cataracts and other operations.

dulled the edge of the knife. Immediately before every operation were the instruments carefully cleansed with pure or very slightly saline water, and wiped (polished) with a clean, soft linen towel, and before use I inspected them, especially the teeth of the iris forceps, with a hand-magnifier. For wiping during and after operation fine and scrupulously cleaned sponges were used, which were selected from a large assortment, laid aside as operating sponges, and never employed for any other purpose. In the cases operated on with antiseptic precautions, the sponges were previously laid in a 3-per-cent. to 5-per-cent. solution of carbolic acid, but washed out in pure or boracic-acid water before wiping with them the wound or the conjunctiva. After the operation the eye was carefully cleansed with pure or boracic-acid water, the closed lids were covered with a thin layer of clean absorbent or borated cotton, over which a layer of cotton, moistened with a 2-per-cent. solution of carbolic acid was placed, and over that another thicker layer of absorbent or borated cotton, so as to pad the eye evenly, the whole held in position by an elastic flannel roller.

The padding in all cases was done with great care, in order to secure immobility of the eye and the wound as much as possible. The patient was admonished to lie in bed as quiet as possible during the first night, and to avoid, also, during the next day, every disturbance by conversation and the like. The bandage was changed as soon as the patient felt uncomfortable, which was usually not before the third day. If then there was no secretion, no swelling of the lid, and no pain, the outside of the lid was gently washed with a fine sponge without opening the eye, and the dressing renewed in the manner in which it was first applied. On the fourth or fifth day the eye was opened and cautiously inspected, but the wound exposed only when irritation was present. Atropine was always instilled before the operation, but generally not before the fifth or sixth day after it. Anæsthesia was only exceptionally required. In nervous and uncontrollable patients it is, I think, of decided advantage, and should not be withheld, as it secures a correct execution of the operation, which otherwise might not be obtained. Ether is

the only anæsthetic which I have used in all operations for eight years, giving it on the so-called choking plan. The average time of producing complete anæsthesia, as computed from several hundred narcotizations noted for that purpose, was one minute and thirty-seven seconds. This, the primary narcosis, can be kept up as long as we wish. The unpleasant after-effects from ether are no worse than those from chloroform, and scarcely ever have I seen, in my own experience, alarming symptoms which made it advisable to discontinue the narcosis, whereas, so long as I used chloroform they were not infrequent. After the sixth day the non-operated eye was left open, and the patient allowed to sit up. For two weeks the operated eye was carefully watched and cleansed, and if the course was regular, the patient was discharged on the fifteenth day.

This being the general plan of the operation, it remains only to say that the operations performed without antiseptics were executed and treated exactly in the same manner, with the exception that the antiseptic **substances** and the spray were omitted. I will state that the in-door department of the N. Y. Ophthalmic and Aural Institute, in which the operations were performed, offers **sanitary conditions** which I have nowhere seen surpassed. The dispensary is in the basement floor, entirely shut off from the in-door department; the laundry is in an annexed building, and above it the laboratory, where most of the teaching is done. The hospital accommodates thirty patients, not in large wards, but in rooms, containing each from one to four beds. Ventilation and cleanliness are rigorously enjoined, and with the occasional exception of one or two rooms in the top floor, where usually the poorest patients are placed, no hospital smell of any kind can be detected. All deodorizers are proscribed. Whenever there is a focus of decomposition, I want to detect and remove it, not to cover and hide it by a deodorizing substance. As soon as a patient is discharged, his bed is taken apart and the whole room cleansed from top to bottom; all closets and pieces of furniture being left open for one or several days, so as to avoid all stagnation of air. Rooms occupied by several patients have to

undergo the same cleansing process every few weeks. When a cataract patient is admitted his room must be put in order at least six hours previously, so that the dust from bedding, carpets, and furniture has had time to settle before the operation is done. The wiping of windows, oil-cloth floors, wood and marble furniture is, of course, done with a damp cloth. The in-door department of the Institute, thus kept more on the plan of a private hotel than of a hospital, has now been in operation for fourteen years, and though by far the greater part of its inmates were operative cases, no hospital disease, pyæmia or septicæmia, has ever been noticed, and local erysipelas, which soon terminated favorably, has occurred in only three cases, in which the bones of the orbit, nose, and mastoid process were extensively implicated in the operation.

The success of a cataract-extraction requiring not only what modern surgeons term "aseptic healing," but primary union, only a partial, very limited, suppuration of the flap is compatible with a useful result. In consequence of that, occulists have long been educated to rules of cleanliness, accuracy, and precaution in operating on the most delicate organ into which a surgical knife can be thrust, and I dare say that, in addition to this training, the great advancement which general surgery has made by the adoption of antiseptic methods, has not been lost upon ophthalmic surgeons, not even on those who, like myself, have not been in haste to believe and proclaim that the spray, the carbolic acid washings, the alcohol and other baths of the instruments, the borated-cotton dressing, and the like, are of paramount importance in eye-operations. Though all oculists agree that without a correct performance of every step of the operation a maximum of success is not obtainable, it may still legitimately be questioned whether in spite of a correct operation external wound-poisons are not sometimes at work which could be rendered innocuous by antiseptic means. To judge of this question not merely from the statements of others, nor from possibly biassed speculations of my own, I put it to the test of experience, and have, in alternating order, operated on half of the cases with antiseptics, on the other

half without. Experience thus far has shown no difference in the result of the two sets of operations. Though the only case (No. 50), which was lost by primary suppuration, was not treated antiseptically, the series of antiseptically-treated cases showed a greater rate of irritative reactive processes, leading in one case (No. 70) likewise to a failure. Moreover, the case of primary suppuration can be satisfactorily accounted for by an improper procedure in the operation, viz., prolonged rubbing to clear the pupil. The cataract was not perfectly mature, and probably complicated, portions of the lens having a whitish, chalky appearance. The series of observations is not long enough to demonstrate a fact positively, but I think **the method of parallel observations,** under conditions otherwise as equal as possible, **is the only correct way to decide on the value of a therapeutic procedure.** Whereas it is not justifiable, on the one side, to ignore a question which involves a great principle, and which, in other departments, has had the most beneficial application, the exclusive followers of a new remedy or a new method, on the other hand, lose the opportunity of observing recoveries by nature or by other methods. Let me cite as an example the fact that the severest wounds of the cornea and sclera heal, as a rule, without suppuration, if the eye is carefully bandaged, without any antiseptic substances, and the patient be kept quiet for several days. On the strength of this observation, which I make every week, I attach very little value to the constant reports of isolated cases in societies and journals, where, under similar conditions, the wound had been closed with an antiseptic catgut suture, or the one or the other antiseptic remedy had been applied, the patient, however, was, in other respects, kept in the same conditions as mine without antiseptics; yet the extremists say, "had we omitted to employ antiseptic precautions, this result would not have been obtained."

All surgeons will agree with me in the proposition that **antisepsis has nothing to do where there are no conditions of putrefaction.** A clean wound in the eye, made without bruising, offers no conditions of putrefaction, and with

rare exceptions—which also the antiseptic treatment cannot control—we see it heal by first intention. Infection of a simple wound from an ordinarily pure atmosphere is, as Lister himself states, very little to be dreaded. There is, however, a proper field for disinfectants, namely, the poisonous discharge from old dacryocystoblennorrhœa. This and other infectious secretions from the conjunctiva or the surroundings of the eye have to be carefully removed before an extraction is undertaken. Would any surgeon leave such foci of infection undestroyed, and trust in the virtue of antiseptic methods?

Why is it that in eye-surgery the advantages of antisepsis cannot be so unmistakably demonstrated as in general surgery, advantages which I am far from denying, though the operative results of Lawson Tait and others are unsurpassed by the strictest adherents to Listerism? The following remarks are offered as an explanation: The eyelids protect the eye from outside influences, and form such a natural cover that wounds of the eye and orbit may almost be considered as subcutaneous; moreover, the conjunctival fluid, the tears, may be regarded as a natural antiseptic, perhaps better suited to the eye than any other. Is it surprising that in well-performed operations on the eye and in the orbit, we see suppuration only exceptionally —in cataract extractions from 1-per-cent. to 3-per-cent.—if a good bandage and rest of the patient secure immobility of the lips of the wound.

I cannot here enter more deeply into the discussion of the question on inflammation in general, and suppuration in particular. I abstain also from comparing statistically the results obtained by either method in the present series of extractions until I shall have larger numbers to draw conclusions from. Should anybody, however, feel inclined to do so, he will find the data in the above tabular synopsis of the cases.

I desire to say a word about **absorbent cotton,** which I have used in the present series almost exclusively, discarding the picked linen which formerly was in general use. I think that absorbent cotton, on the whole, is a cleaner ma-

terial than charpie; it absorbs liquids well enough though not pus, but its chief virtue lies in its elasticity which far surpasses that of charpie. It forms an excellent pad which, when held by a flannel roller, secures by even elastic pressure immobility of the lips of the wound better than any other dressing I know of.

The *incidents* of the operation and the abnormal *reactive processes* occurring during the course of healing need not be specially mentioned, since they have been spoken of at the consideration of the different kinds of cataract, and are described in detail in the synopsis of the cases. The present series of operations again showed a remarkable infrequency of irritation during the course of healing, and I think that by careful attention in the dealing with the capsule and iris, on the importance of which I have always dwelt, in concurrence with many others, the inflammatory processes can be further so much reduced that the operation of extraction will yield the same, or almost the same, rate of recovery as iridectomy.

It seems well worth while to search systematically **why extraction is not yet made with the same safety as iridectomy.** The instruments are the same, and as in iridectomy nobody thinks of disinfecting his instruments if they are only clean, we may fairly conclude that for cataract-extraction no more is requisite. The greater size of the extraction-wound has been alleged as one of the causes of failure, and yet the size in itself is not such as to seriously interfere with the nutrition of the parts concerned. The excision of the iris is alike in both operations. The initial steps are the same in the one as in the other. The danger, therefore must lie in the subsequent steps: the *opening of the capsule*, and the *expulsion of the lens.*

For many years I have watched with particular attention the reactive processes due to the laceration of the capsule. I will repeat them briefly:

1. Extensive laceration gives rise to reactive processes showing the clinical picture of a plastic, and sometimes even of a suppurative inflammation, which starts from the capsule and implicates the iris and ciliary body.

2. The remedy, excision of the anterior capsule, which for

ten years I have persistently tried in three hundred operations, has proved a failure: it gave eleven per cent. of loss. The cause of this unfavorable issue was, I presume, the large exposure of the inner surface of the rest of the capsule and its adherent parts to the influence of the aqueous humor; producing in many cases the union of the two leaves of the crystalloid, in others inflammatory irritation.

3. Shreds of capsule may remain folded or unfolded between the lips of the corneal wound, preventing its thorough closure and leading to different kinds and degrees of inflammation: adhesive, plastic, and suppurative keratitis and kerato-iritis.

I have described all these processes so minutely and repeatedly in my former reports, illustrating them by actual personal observations, that I dare not again return to them. They have thus far not received that attention on the part of operators which I confidently believe they deserve. Six years ago, one of my European friends, whose name justly is considered to be authority in the question of cataract-extraction, told me confidentially in Heidelberg, after I had at the Congress communicated my observations and views on the reactive processes of the capsule, that "he did not believe a word of all I had said on the inflammatory processes of the capsule." Yet so firmly was I convinced of the correctness of my observations that I was resolved to abandon my former practice of opening the capsule widely, or removing its anterior part. From that time I have acted on a directly opposite principle, viz.: to interfere with the capsule as little as possible; not to lacerate it any more, but to open it by a peripheral incision of such limited extent as was compatible with an easy exit of the lens. The results of my experience in this direction have been communicated from time to time in these ARCHIVES and some other periodicals. The present report is offered as additional material for the discussion of a subject in which bare facts weigh more heavily than the most plausible arguments. In the great majority of cases the incision-wound in the capsule was found closed at the first inspection of the eye, the capsule was evenly stretched across the pupillary area, and the eye in the condition we find it after iridectomy.

The peripheric opening of the capsule diminishes the incarceration of the capsule more than any other method, but does not completely exclude it. In the present series there are two or three cases of peripheric whitish exudation, in one distinctly tongue-like, which may have owed their origin to a **protrusion** of a part of the edge of the capsule through the corneal wound. Capsular **adhesions** to the corneal scar were not infrequently noticed, but produced no or only very little reaction. That incarceration of portions of capsule may have prejudicial effects and ought to be studiously avoided, cannot be doubted, but *De Wecker* went too far when, at the first meeting of the recently founded *Société Française d'Ophthalmologie*, he made the sweeping assertion: *La suppuration ne dépend ni de la plaie cornéenne, ni de l' iridectomie, mais bien de l'ouverture de la capsule.*[1] The opening of the capsule may certainly be considered as a cause of suppuration, but not as the only one, for A. and H. Pagenstecher, both skilled and careful operators, had their share of suppuration also after extraction of the lens with the unbroken capsule.

From the preceding remarks the following conclusions appear to be uncontrovertible: *The capsule is an element of danger in the extraction of cataract.* As long as the removal of the lens with the unopened capsule, according to its warmest advocate, H. Pagenstecher, is indicated only in one third of the cases, *we should adopt that method of opening the capsule which makes it least liable to become the starting-point of irritative reaction.* **That method is the peripheric incision.**

The disadvantage inherent to it, the depression of the acuteness of vision in many cases by obstruction of the centre of the pupil—disadvantage which caused the originator of the method, Gayet, to abandon it again—can be satisfactorily met by a subsequent central division, as we shall see hereafter.

The second and last step which makes extraction a more dangerous operation than iridectomy is the *expulsion of the lens.* The expulsion itself, without any of its secondary

[1] *Recueil d'ophthalmologie*, Feb., 1883, p. 111.

effects, is a prejudicial element by adding to the traumatism. It is a surgical axiom that the healing of a wound will, other things being equal, be so much the kinder as the handling of it is less. The opening of the capsule, the expulsion of the lens, and the removal of remnants of cortex are three acts which are added to the traumatism of an iridectomy, and as such, apart from every thing else, increase the danger.

They are, however, less to be dreaded for themselves than for the prejudicial consequences which they involve. It is the expulsion of the cataract and its remnants that crowds portions of iris and capsule outward, presses upon and bruises them as well as the edges of the corneal wound.

Small protruding portions of capsule and iris may cause plastic and suppurative inflammation without being bruised and without the interference of bacteria. I believe in the **mechanical origin of inflammation** as well as I believe in **septic poisoning of a wound.** If Uskoff (*Virchow's Archiv*, vol. lxxxvi, p. 150) produced no reaction by one or two subcutaneous injections of indifferent fluids, but inflammatory irritation and suppuration by repeated injections, done with all antiseptic precautions; if a foreign body, of which I have but recently observed an example, lies quietly in the iris for fifteen years, then during the sixteenth year causes transient attacks of congestion of the iris after manifest exposures, and at last surrounds itself with a collection of pus, as shown after its removal with the corresponding portion of the iris, the eye being otherwise intact: we cannot doubt the possibility of a formation of pus without the interference of microörganisms, and I need not adduce any other arguments. In my laboratory days I, as multitudes of others, have placed a fresh frog's cornea under the microscope, and in the course of an hour have seen the movable cells wander toward the margin of the specimen and there accumulate in a row. May not, in a higher degree, the same phenomenon occur in the living wounded cornea, say simply by a locomotion of the movable cells toward the place of least resistance? If the wound is not irritated, these elements will, as a kind of callus, cement its edges, as is not infrequently seen in

corneal sections after extraction. They, as formative elements, will constitute the white scar. The same scar is observed, clinically, in transparent membranes, which are divided within the eye, *e. g.* the white line in the capsule which remains as the indelible trace of a former division. Moreover, the same white line is noticed at the edges of the capsular opening after secondary, central division, and very beautifully at the edges of a retinal perforation in cases of foreign bodies situated and tolerated in the background of the eye. It only needs the accession of a prolonged irritation, such as may take place when, after a cataract-extraction, the patients move their eyes frequently, or press on them, and thus *repeatedly* open the wound, to produce an inordinate migration of movable cellular elements, together with abundant serous exudation. The formative elements will then no longer be in a condition to organize into connective tissue, but will crowd in the edges of the wound and become free—purulent infiltration and discharge. Accepting Cohnheim's theory, of suppuration being produced by the emigration of white blood cells from the capillaries, we can imagine that prolonged irritation in the cornea will cause the greatest emigration to occur near the terminal vascular loops at the corneal margin. This may account for the appearance of the so-called ring abscess as the initial stage of the total suppuration of the cornea.

Prolonged irritation of the corneal wound, leading to its repeated rupture, may be produced by pieces of iris, lens, or capsule, situated in the section and projecting beyond its external margin. These projections will, at every movement of the eye, rub against the lid, retarding or eventually preventing the final closure of the wound.

Thus much about the mechanical origin of suppuration; now some words about **its parasitic or septic origin**. First, I will unhesitatingly put myself on record as not believing that ordinarily pure air—I mean the air in a healthy locality, not over-fraught with dust—will infect a clean wound of incision, but I believe that contused wounds may be detrimentally invaded by the microörganisms contained in the atmosphere. The bruised parts must mortify as far

as their nutrition is stopped. The dead parts may be cast off by the healthy—partial sloughing—after which healing of the wound under more or less intense inflammation will take place; or the dead parts, soon invaded by bacteria, will remain for some time in contact with the living, act as a powerful irritant, and produce suppuration in the adjacent tissue with its consequences—septic infection. The therapeutical problem is: first, to operate in such a way that no mortification by bruising occur; and secondly, where we can not avoid it, to take such measures as to prevent the putrefaction of the bruised parts—antiseptic treatment. While fully recognizing this principle, and determined to continue in my parallel observations of operations performed with and without antiseptic means, I will only repeat that I consider the correct execution of the operation of paramount, antisepsis of secondary, and disinfection of least, importance. The antiseptic methods which have hitherto been used in surgery are too well known to justify any remarks on them, only the recent procedure of De Wecker, I think, ought not to be left unmentioned. Wecker, who, with his proverbial versatility, two years ago thought the spray to be indispensable for obtaining first-class results, has now thrown the same overboard, and terminates the cautiously performed operation by stroking the wound (he makes a conjunctival flap) with a tortoise-shell probe dipped in a 2-per cent solution of carbolic acid.[1] He mentions that after having had six cases of phlegmon of the eye while he used the spray, he had, since he abandoned it, not a single phlegmon in 400 cases.[2] This is a brilliant result, and it looks as if he had presented us with a method which really controlled suppuration after cataract-extraction. Not doubting the correctness of his statement, I trust he will not find fault with us if we postpone our final judgment until a more detailed account of these 400 extractions has appeared. There may be other causes of failure than suppuration, of which the carbolic acid, painted over the wound in such

[1] *Annales d' ocul.* Nov.–Dec., 1882, pp. 218 and 219

[2] *Rec. d' opthal., l. c.*

strength as really to act as an efficient antiseptic, is, perhaps, not innocent.

I come to the last part of this report,

VI.—THE AFTER-OPERATIONS.

In thirty-eight cases after-operations were made :

1. *Discision* with a knife-needle, as described in previous reports, in thirty-four cases. Two of them (Nos. 3 and 11) were followed by reaction and protracted recovery, but the final results were good. No case was injured by this after-operation—almost all were greatly benefited. The operation was frequently made as early as the third week. I find that the sooner after extraction it is performed, the easier the capsule is cut ; yet I always wait until the reaction from the extraction has subsided and the wound is consolidated.

2. *Dislocation of thickened centre of capsule* with the same needle in two cases. In some cases I have detached adhesions of the capsule with the iris, sweeping the knife-needle along the pupillary margin where the capsule was thinnest, and then have slightly dislocated the thickened part. This method refers to cataracta accreta.

3. *Iridectomy* in two cases ; in both of which the cataract had been traumatic and dislocated into the anterior chamber. Other cases of this series will doubtless come to have the capsule split later. The operation has, thus far, succeeded in all cases, and as it is the necessary completion of the primary operation in the majority of instances, I can say in its favor and in favor of the whole method, that it appears to be a harmless procedure, and that the vision obtained by it will not deteriorate afterward, as often occurs in most other methods of extraction where the centre of the capsule is primarily lacerated. The vision, after subsequent division of both capsules, generally becomes sharper months and years afterward, because the process of contraction and thickening of the periphery of the capsule will enlarge its central perforation.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE SECOND AND THIRD QUARTERS OF THE YEAR 1882.*

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE COÖPERATION OF

E. Nettleship, London; C. E. Fitzgerald, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; van der Laan, Lisbon; Hirschmann, Charkow; S. M. Burnett, Washington; Ole Bull and Schiötz, Christiania.

Translated by Dr. F. E. D'Oench, New York.

B.—ANOMALIES OF REFRACTION AND ACCOMMODATION, LIDS, LACHRYMAL APPARATUS, MUSCLES AND NERVES, ORBIT AND NEIGHBORING CAVITIES, CONJUNCTIVA, CORNEA, AND SCLERA.

By Dr. C. HORSTMANN.

I.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

1. Schubert. The influence of the slanting system of penmanship upon the eyes of children. *Bay. Aerztl. Intelligenzblatt*, vol. xxix, No. 21, 1882.

2. Berlin, R. The physiology of handwriting. *Arch. f. Ophth.*, vol. xxviii, 2, p. 259.

3. Berlin, R. The hygienic advantages of the slanting system of penmanship. Rep. on the 14th meeting of the Ophth. Soc. at Heidelberg, 1882.

Schubert (1) insists upon placing the book parallel to the table's edge and would exclude the inclined system of penmanship entirely from the schools, as

* Continued from page 516, vol. XI.

the difference in the distance of the two eyes from the point of fixation produce unequal accommodation, which may easily lead to the loss of binocular vision, and further on to difference in refraction and visual power, and finally to squint.

BERLIN (2 and 3) denies these conclusions. The act of writing is controlled by the eye, in particular by the laws which govern the movements of the eye. As the downward stroke is always perpendicular to the base line, it must cross the latter, when writing with letters inclining to the right, from the left side and above to the right side and below. The consequence is that when the book lies straight the child must sit inclined to the right, may sit straight when the book is placed obliquely, and when this position is exaggerated must sit inclined to the left. The inclined system of penmanship, when the book is placed obliquely, has this advantage over the vertical system, inasmuch as it requires much less muscular exertion, the vertical system calling all the muscles of the arm up to the shoulder into play.

1. SCHLEICH. Ophthalmoscopic examination of the eyes of 150 new-born children. NAGEL'S *Commun. from the Ophth. Clinic at Tübingen*, vol. iii, p. 144.

2. ALBRECHT. Statistical contributions to the knowledge of myopia. *Klin. Monatsbl. f. Augenhk.*, vol. xx, p. 342.

3. TSCHERNING. Studier over Myopiers Ætiologi. Copenhagen, 1882.

4. BORTHEN, LYDER. Tests of refraction and color-blindness of 550 children in three different schools. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 406.

5. Myopia in France. *Brit. Med. Journ.*, May, 1882, p. 755.

6. Short-sight a fashion. *Med. Times and Gazette*, April, 1882, p. 406.

7. COHN. The eyes of school-children. EULENBURG'S *Real-Encyclop.*, vol. xii, p. 248.

SCHLEICH (1) found the eyes of the new-born to be hyperopic, the same as Königstein, Horstmann, and Ely.

According to the observations of ALBRECHT (2), the degree of refraction was the same in both eyes in 40 % of 1,638 cases examined. In 50.6 % of 940 cases the result of the examination of both eyes was the same with the ophthalmoscope as with glasses, in the remainder there was a difference. Out of 1,120 cases there were 417 with high degrees of myopia, *i. e.*, more than 6 D. 41 (10 %) of these showed no traces of atrophy of the choroid, or sclerectasia. Cases were also observed in which an increase of the degree of myopia without convergence or accommodation could be demonstrated.

TSCHERNING (3) draws his conclusions from the observation of 9,567 persons. He distinguishes three kinds of myopia: 1. Myopia from unknown causes not due to close vision or diseases of the eye, perhaps to hereditary predisposition. This kind of myopia is either congenital or develops up to the age of twenty-five. The fundus is normal; there is either no conus or only a very narrow one. Vision is generally good. As a rule, only the lowest degrees of myopia belong to this category. 2. Myopia due to too near vision is most common among the educated classes. It is less than 9 D; on an average it about equals 4 D. Sometimes there is a congenital predisposition. The ana-

tomical changes are not yet sufficiently well known. It is rarely complicated with choroidits, but the conus is common. 3. Excessive degrees of myopia (more than 9 D) are governed by another law in their distribution. They are found in all classes of society without regard to their occupation; they must be regarded as a genuine disease and are comparatively rare, scarcely in more than 1 % of the population. This form of myopia is always due to an elongation of the globe, and is generally complicated with other diseases of the eye, especially of the choroid. It is probably a chronic form of choroiditis, with exudations into the vitreous. SCHIÖTZ.

1. WEISS Contributions to the anatomy of the myopic eye. *Commun. from the Ophth. Clinic at Tübingen*, vol. i, 3, p. 63.

2. CARL THEODOR, duke in Bavaria. Some anatomical conditions in myopia. *Commun. from the Royal Ophth. Clinic*, Munich, vol. i, 3, p. 233.

WEISS (1) examined two eyes with a low and two with a high degree of myopia. He found that the conus of myopia is not due to a thinning of the choroid at this point with deposit of pigment, but to an extensive traction of the broad folds of the optic nerve across the scleral margin by the choroid, which was entirely wanting over the conus. He also showed that the hyaloid and external limiting membrane of the retina must be strictly kept apart, according to the views of Schwalbe, and in opposition to those of Henle and Iwanoff. As regards the choroid over the staphyloma, it is found that the retina is attached in numerous little spots to the choroid, and this again to the sclera. As it approaches the optic nerve the choroid becomes thinner and thinner, and its attachment to the sclera firmer and firmer. At the optic nerve itself the adhesion is very firm. The small portion of the choroid corresponding to the staphyloma is totally devoid of pigment and contains a few medium-sized blood-vessels, partly filled with blood, partly obliterated.

Duke CARL THEODOR (2) also found that the cone so frequent in myopic eyes is due to a supratraction of the retina. He also found that the increased area of the blind spot, maintained by Nagel, may well be brought into accord with the anatomical conditions; for both upon the refraction and supratraction side the light-perceiving elements do not approach the optic nerve as close as is normally the case.

SCHROEDER. De l' essence de l 'hypermetropie manifeste et de l' hypermetropie latente. *Arch. d'ophth.*, vol. ii, No. 4, 1882.

For the lower degrees of hypermetropia, up to 4 D, the ratio between the latent degree of hypermetropia and the breadth of accommodation is constant, the fraction of the whole breadth of accommodation represented by the latent degree of hypermetropia always remaining the same, no matter whether it be reduced by age or insufficiency of the ciliary muscle (atropine). If the power of accommodation (a) at the age of 10 — 14 D, the entire hypermetropia is latent, and the ratio of accommodation — $\frac{Ht}{14}$. As this ratio remains unchanged, when a diminishes Hl — $\frac{Ht.\,a}{14}$, and as Hm — Ht — Hl, Hm — $\frac{Ht\,(14-a)}{14}$, Hl and Hm were calculated in a number of cases according to this formula, and were seen to agree with the values found, both when the accommodation was normal or had been paralyzed. v. MITTELSTÄDT.

1. RÄHLMANN. The optical effect of hyperbolic lenses in keratoconus and irregular astigmatism. *Klin. Monatsbl. f. Augenhk.*, vol. xx, p. 111.

2. ANGELUCCI. Contribuzione all' applicazione delle lenti iperboliche. *Quadri statistici e frammenti di oftalmologia*, Roma, 1882.

RAHLMANN (1) publishes fourteen cases of keratoconus, whose vision was increased by the use of hyperbolic lenses. Vision increased considerably, the field of vision became clear, and objects were rendered more distinct.

ANGELUCCI (2) found V $= \frac{1}{4}$ in one eye, and $= \frac{1}{8}$ in the other, after correcting the keratoconus with hyperbolic glasses, while strong concave glasses increased V only to $\frac{1}{8}$ resp. $\frac{1}{7}$. In high degrees of myopia also hyperbolic lenses increase vision a little more than ordinary concave glasses, peripheric vision especially becomes more distinct. DANTONE.

1. HARLAN. Cases of unusually high degree of accommodation spasm, myopia simulated by hypermetropic eyes. *Med. News*, May 6, 1882.

2. GRIFFITH. Sudden paralysis of accommodation completely restored in a week. No specific cause. *Ophth. Rev.*, vol. i, May, 1882, p. 183.

3. VELARDI, E. Dell' astenopia accommodativa. *Boll. d' ocul.*, vol. iv, Nos. 9, 10, 11, 12.

4. MOOREN. *Five lustra of ophthalmological practice*, p. 274.

HARLAN (1) reports three cases of spasm of accommodation, in which myopia $\frac{1}{7}$ resp. $\frac{1}{8}$ was found before using atropine, but afterward hypermetropia $\frac{1}{18}$ resp. $\frac{1}{18}$ and $\frac{1}{12}$.

GRIFFITH (2) reports recovery from paralysis of accommodation in course of a week after the use of quinine and strychnine. FITZGERALD.

VELARDI (3) gives an elementary treatise on hypermetropia and accommodation. DANTONE.

MOOREN (4) mentions the rapid fatigue of the ciliary muscle after severe illness, in sensitive women and onanists. He saw sudden spasm of accommodation develop after injuries in the ciliary region, also in uterine diseases and long-continued close vision.

II.—LIDS AND SURROUNDINGS OF THE EYE.

1. KROLL. Contribution to the pathology and treatment of blepharitis simplex. *Berlin. klin. Wochenschr.*, No. 27, 1882.

2. TAMAMCHEF. Another contribution to the pathology and treatment of the affections of the margin of the tarsus, especially trichiasis and distichiasis. *Centralb. f. pract. Augenhk.*, p. 263, 1882.

3. BURCHARDT. Contribution to the treatment of trichiasis. *Charité-Ann.*, vol. vii, p. 633.

4. BLEICHER. Pediculi pubis in the lashes of children. *Wiener med. Wochenschr.*, No. 32, 1882.

5. LEVISTE. Blepharite ciliaire due à la présence de pediculi pubis dans les cils des paupières supérieures. *Jour. des connais. méd.*, No. 32, 1882.

6. ORTIZ, PEREZ. Tumor gomoso ulcerado des párpado superior tratado con la tintura de jodoformo. *Oftalm. prat.*, vol. i, No. 4, p. 80.

7. WIETHE. Cases of syphilitic affections of the lids. *Allg. Wiener med. Zeitung*, No. 23.

8. GALEZOWSKI. Chancre des paupières et du globe oculaire. *Rec. d'ophth.*, vol. iii, 10, p. 604.

9. STREATFEILD. Syphilitic chancre at the inner canthus. *Brit. Med. Jour.*, Sept. 30, 1882, p. 644.

10. DUBUJADOUS. L'étude de l'œdème malin des paupières. *Arch. génér. de méd.*, Oct. 1882.

11. RAEHLMANN. Amyloid degeneration of the lids. *Arch. f. Augenhk.*, vol. xi, p. 402. These ARCHIVES xi, p. 466.

12. GERIN-ROZE. Blépharite chronique tuberculeuse. *Soc. méd. des hôp.*, Feb. 10. *L'union méd.*, No. 51, 1882.

13. GROS. Eléphantiasis des paupières et de la région temporale. *Rev. méd. de l'est*, Jan. 1, 1882.

14. HOCK. Ptosis. *Eulenberg's Real.-Encycl. des ges. Heilk.*, vol. xi, p. 167.

According to TAMAMCHEF (2), trichiasis and distichiasis are due to purulent inflammation of Meibom's and the tarsal glands and their surroundings. His treatment consists in making a longitudinal incision parallel to the orifices of the glands. The surface thus exposed is then touched with a sharp nitrate of silver stick. When the scab which then forms becomes detached, the hairs fall out with it.

BLEICHER (4) saw blepharitis in little children due to pediculi on the lashes.

LEVISTE (5) verified this observation with the microscope, after the usual treatment for blepharitis had failed, and thinks the disease more frequent than is generally assumed. V. MITTELSTADT.

WIETHE (7) reports three rare cases of syphilitic affections of the lids: 1. Syphilitic primary sclerosis of the right lower lid. 2. An ulcerating papule of the left upper lid. 3. Gumma of the right lower lid.

STREATFEILD (9) saw an indurated syphilitic ulcer at the inner canthus. Cured by inunction.

According to RAEHLMANN (11) amyloid degeneration begins in the lymphoid cells of the subepithelial layer, while the supporting tissue at first remains intact.

GERIN-ROZE (12) saw on the right upper lid of a debilitated man who had suffered from hemorrhage at various times, several small and one larger ulcer, with sharp, swollen edges, which penetrated into the cartilage; he was inclined to consider them tuberculous. V. MITTELSTADT.

1. HUME. Ectropium of both eyelids operated on by Wolf's method. *The Lancet*, vol. ii, No. 3, 1882.

2. SNELL. Case of ectropium successfully treated by transplantation of a large non-pedunculated flap from the arm. *The Lancet*, vol. ii, No. 3.

3. BENSON. Restoration of the eyelid by transportation of skin from distant parts of the body. *Med. Press*, Apr. 1882, p. 303. *Brit. Med. Jour.*, Apr. 29, 1882, p. 620.

All the authors mentioned report good results of transplantation of a flap without a pedicle, according to Wolf's method.

1. DRANSART. Guérison du ptosis par des procédés opératoires spéciaux. *Ann. d' ocul.*, vol. lxxxviii, p. 147.

2. WECKER. Une nouvelle opération du ptosis. *Ann. d' ocul.*, vol. lxxxviii, p. 29.

3. PANAS. D' une modification apportée au procédé dit de transplantation du sol ciliaire. *Arch. d' ophth.*, vol. ii, No. 3, p. 208.

4. WILLIAMS. On the treatment of entropium and trichiasis by a new operation. *Liverpool Medico-Chir. Jour.*, July, 1882, p. 319.

5. DIANOUX. De l' autoplastie palpébrale par le procédé de Gayet. *Ann. d' ocul*, vol. lxxxviii, p. 132.

6. CARRE. Ectropion cicatriciel de la paupière intérieure. Operation avec greffe dermo-épidermique. *Gaz. d'ophth.*, No. 11, 1882.

7. BOLLIET. De la greffe cutanée et de ses applications principalement à la chirurgie oculaire. *Thèse de Paris*, 1882.

8. FIEUZAL. De l' ectropion. *Union méd.*, No. 16.

9. PANAS. Tarsoraphie. *Gaz. d'ophth.*, No. 6, 1882.

10. BUSINELLI. Sulla tarsoraphia preventiva. *Boll. dell' Acad. méd.*, vol. viii, No. 6 and *Boll. d' ocul.*, vol. v, No. 1, Sept. 1882.

11. PERGAMIN. Entropium-operation according to Squar's method. *Wratsch*, No. 26.

12. SZOKALSKI. Rare case of union between the upper lid and eyeball. *Medycyna*, No. 9, 1882.

DRANSART (1) claims priority over Pagenstecher in advising to transmit the raising of the lid to the frontal muscle in ptosis.

WECKER (2) describes a new method for ptosis, which consists in a combination of that of Pagenstecher and Gräfe. As in Gräfe's method an oval piece is cut out of the skin and orbscularis muscle of the upper lid, after which two sutures are applied, similar to Pagenstecher's method, one in the inner, the other in the outer part of the lids. The needle is introduced over the inner part of the eyebrow a finger's breadth above the orbital margin, passed downward under the skin and muscle, out again at the upper margin of the wound, under the edge of the excised orbicularis muscle, entered again under the edge of the orbicularis muscle of the lower margin of the wound, and passed along under the skin of the marginal part of the lid, and then back again, so that the points of entry and exit of the needle are above the eyebrow, about $\frac{1}{2}$ *mm.* apart. The two ends of the thread are then tied over a little roll of leather. In the same manner a thread is passed through the outer part of the eyebrow and lid. When the threads are tied the edges of the wound are brought in contact, and should heal by first intention. As soon as the threads have cut through the skin at the margin of the lid, they are removed.

MARCKWORT.

PANAS (3) modifies the method of Anagnostakis in transplanting the lashes, by detaching the flap of skin as far as the margin of the lid, leaving it only connected with the conjunctiva, then severing the orbicularis muscle and

pushing it upward. He then unites the flap with the ligamentum tarsi superius.
v. MITTELSTÄDT.

In operating for entropium and trichiasis, WILLIAMS (4) makes Burow's incision of the tarsus from the conjunctival side, passes sutures to the outer side, as in the operation of Anagnostakis and Snellen, and ties the thread on the external surface of the lid. NETTLESHIP.

DIANOUX (5) operates for entropium as follows: He makes an incision parallel to the margin of the lid, four *mm.* from its edge, passes Guérin's double-edged knife into the margin of the lid behind the lashes, and thus divides it into an anterior and posterior plate. He forms a strip of skin containing the lashes, and another three *mm.* broad above the first incision, draws the upper strip under the lower, and fastens the former in the position of the latter.
MARCKWORT.

In cicatricial ectropium of the lower lid CARRÉ (6) cuts the cicatricial tissue, makes the lid movable, and freshens the edges of the lid. Flaps without a pedicle, which do not extend through the whole thickness of the lid, are then transplanted into the defect. v. MITTELSTADT.

FIEUZAL (8) reports a case of cicatricial ectropium of the lids from combustion, in which he succeeded, after cutting the cicatricial bands, in transplanting two flaps, without a pedicle, of ten and six sq. *cm.* respectively.
v. MITTLESTADT.

In cases in which a partial tarsoraphy becomes necessary for lagophthalmus due to shrinkage of the lid, or ectropium, the palpebral fissure, according to PANAS (9), should not be opened until after a long time, and then only gradually at great intervals, in order to prevent a failure. v. MITTLESTADT.

In a patient who had lost the skin of both lids with the exception of a narrow strip along the margin from a malignant pustule, BUSINELLI (10) made a preventive tarsoraphy at a time when the whole surface was still granulating, in order to prevent cicatricial contraction. He gained his object, as a month later the edges of the lids were still firmly united, while the ulcer was almost completely covered with new skin. DANTONE.

In operating for entropium PERGAMIN (11) substitutes a serre-fine for the toothed forceps when applying the suture according to Squar. HIRSCHMANN.

SZOKALSKI (12) saw the posterior edge of the upper lid united with the lower part of the conjunctiva of the globe by a membrane $\frac{1}{4}''$ broad, which covered the cornea. Cured by severing it with a pair of scissors. HIRSCHMANN.

1. ABADIE. Traitement du blépharospasme par le massage forcé du muscle orbiculaire. *Gaz. des hôp.*, Oct. 7, 1882.

2. PANAS. Blépharospasme hystérique traité par l'élongation du nerf sus-orbitaire. *Semaine méd.*, March 2, 1882.

3. MILLES. Spasmodic entropium of lower lid. *Roy. Ophth. Hosp. Rep.*, vol. x, p. 388.

4. DANESI. Un caso di logoftalmo da paralisi del faciale curato colla faradizzazione. *Bollet. d' ocul.*, vol. v, 1, p. 7.

After having put some vaseline on the lid, ABADIE (1) rubs the orbicularis

muscle with the thumb, from the centre of the eye toward the periphery. He cured two cases of blepharospasm in this manner; in the third the treatment failed.

PANAS (2) cures blepharospasm by stretching the infra-orbital nerve.

1. WEINLECHNER. The treatment of angiomata. *Wiener med. Blätter*, 1882, Nos. 38 and 39.

2. AGUILAR BLANCH. Melanosarcome de la paupière; exstirpation; guérison. *Rec. d' ophth.*, vol. iii, No. 10, p. 620.

3. COOMES. Round-cell sarcoma involving the eyelids and adjacent parts of the face. *St. Louis Med. News*, Jan. 28, 1882.

4. HUMBERT. Tumeur éréctile de la paupière supérieure droite chez un enfant de 8 mois. *Rev. de thér.*, No. 12, 1882.

5. LUNDY. Remarks on important cases. *Rep. of the Mich. Eye and Ear Infirmary.*

6. CORNWELL. Dermoid cyst of the lid. *Med. Record*, Sept. 23, 1882.

WEINLECHNER (1) advises to spare the skin of the lid, especially the edge and cartilage, when extirpating an angioma. A plastic operation should not be attempted at once, unless the indications are imperative, but the natural course of healing should be allowed to proceed and an operation done later if necessary. It is especially difficult to remove the angiomata at the inner canthus. Here Weinlechner tampons the wound with styptic cotton, but does not unite the edges, in order that any remnants may be destroyed with lapis or the galvanocautery from the wound.

HUMBERT (4) removed a tumor of the right upper lid of the size of an almond by injecting a dilute solution of the sesquichloride of iron, which only produces a coagulation of the blood, similar to that under normal circumstances.

v. MITTELSTADT.

LUNDY (5) removed a varicose tumor from a child by means of electrolysis. The tumor was situated at the root of the nose, and had involved both eyebrows and half of the left upper lid. A battery with 22 elements was used. The introduction of the needles was followed by considerable reaction. Twelve days later they were again applied; at the end of three weeks scarcely a trace of the tumor was left, and the needles were introduced at only one point. The result was perfect and only a small scar remained. BURNETT.

LANDESBERG. Phthiriasis pubis of the eyebrows. *Phil. Med. Bull.*, vol. iv, No. 6.

In a child eczema developed in the region of the eyebrows. After the removal of the crusts the parasites and their ovula could be easily recognized.

ARMAIGNAC. Sur les conséquences de la gravité des plaies du sourcil. *Rev. d'ocul. du sud-ouest*, No. 8, p. 145.

III—LACHRYMAL APPARATUS.

1. GALEZOWSKI. Nouvelle méthode de traitement des voies lacrymales au moyen d'un dilatateur. *Re.c d' ophth.*, 1882, No. 8, p. 449.

2. CHIBRET. Une methode de stricturotomie destinée à remplacer le procédé de Bowman dans le traitement du rétrécissement des voies lacrymales. *Rec. d' ophth.*, 1882, No. 6.

3. MOOREN. *Five lustra of ophthalmological practice*, p. 83.

4. CAMUSET. Des tumeurs à leptothrix des voies lacrymales. *Rev. d' ocul. du sud-ouest*, vol iii, p. 217.

GALEZOWSKI (1) has devised an instrument by means of which he forcibly dilates strictures of the lachrymal canal. The instrument acts like a glove-stretcher. The portion introduced into the lachrymal canal is no thicker than No. 4 of Bowman's probes; by pressing upon the other end of the instrument, the two branches forming the portion within the canal separate and dilate it to an extent corresponding about to No. 10 or 12 of Cooper's probes.

MARCKWORT.

CHIBRET (2) is opposed to the dilatation of strictures of the lachrymal canal by means of probes; he recommends incision according to a modification of Stilling's method. MARCKWORT.

MOOREN (3) treats catarrh of the lachrymal sac and duct with lukewarm solutions. When the local irritation has somewhat subsided, lukewarm solutions containing a little boracic, salicylic, or carbolic acid are injected into the lachrymal canal. In a few cases only Bowman's probes were introduced.

CAMUSET (4) reports a case in which masses of leptothrix completely filled the lachrymal duct.

1. CARRÉ. De l' inflammation de la glande lacrymale. *Gaz. d' ophth.*, No. 5, 1882.

2. STREATFEILD. Syphilitic inflammation of the lachrymal gland. *Brit. Med. Jour.*, Sept. 30, 1882, p. 635.

3. SNELL, S. A case of dislocation of the lachrymal gland. *Ophth. Rev.*, vol. i, No. 8, p. 207.

4. WHITE. Tumor of the lachrymal gland. These ARCHIVES, March, 1882, vol. xi, p. 62.

CARRÉ. (1) saw a tumor as thick as a finger develop under the left upper eyelid of a man of thirty-five, together with erysipelatous swelling and redness. An incision showed it to be due to an inflammation of the lachrymal gland.

v. MITTELSTADT.

STREATFEILD (2) reports a case of dacryo-adenitis of specific origin.

FITZGERALD.

PARINAUD. Fistule dentaire simulant une fistule lacrymale. *Journ. des connaiss. méd.*, 1882, No. 36.

In a child, seven years old, an abscess developed in the region of the lachrymal sac, resulting in a fistula. At the same time there was also a dental fistula of the carious upper canine tooth. Parinaud assumes alveolar periostitis with formation of a fistula, and explains its peculiar position by the peculiar arrangement of the alveoli of the upper maxillary of children. Cured by extracting the tooth in question. v. MITTELSTADT.

IV.—MUSCLES AND NERVES.

1. SCHNELLER. Contributions to the knowledge of strabismus. *Arch. f. Ophth.*, vol. xxviii, 2, p. 97.

2. FANO. Du strabisme chez les jeunes enfants; traitement. *Le scalpel*, No. 52.

3. BONNEMAISON. Des differents procédés chirurgicaux pour le traitement du strabsime monolatéral excessif. *Thèse de Paris*, 1882.

4. ABADIE. Strabisme. Traitement opératoire. *Nouveau dictionnaire de méd. et de chir.*, vol. xxxiii, p. 709.

5. JAVAL. Strabisme. *Ibid.*, p. 698.

6. HOCK. Strabismus. *Eulenburg's Real-Encycl. d. ges. Heilk.*

SCHNELLER (1) reports his investigations on the field of fixation in cases of divergent and convergent squint. It is characteristic of accommodative convergent strabismus that the squint disappears either at once or after a few days or weeks, when corrected with the proper glass, and that the extent of the field of fixation remains within the normal. Amblyopia of both eyes favors the development of convergent strabismus, though the degree of hypermetropia may be but a low one, also all the factors which tend to diminish the value of binocular vision. Muscular convergent squint disappears under the influence of the proper glass, either at once or after the lapse of a few days or weeks; the extent of the fixation field of the interni also exceeds that of the externi more than under normal conditions. In divergent squint the degree of strabismus is not entirely proportional to the preponderance of the external recti.

In strabismus, with normal motility of the muscles, an operation is unnecessary—glasses will suffice; in muscular strabismus an exact examination of the field of fixation must be made in order to find a suitable method of operation. Schneller thinks that the most important result gained by his investigations is the distinction which must be made between refractive, accommodative, and muscular strabismus.

FANO (2) thought he had shown once before that convergent squint is more common in myopia than in hypermetropia of the deviating eye. He is opposed to the correction by glasses, and recommends antispasmodic remedies, besides orthopædic treatment, as he ascribes strabismus to an unequal distribution of nervous influences.

In advancement, ABADIE (4) makes a vertical incision at the corneal margin, and abscises a strip about 2 *mm.* wide from the outer edge of the wound. After detaching the muscle he applies the suture by passing the needle first through the conjunctiva bordering on the cornea, and then through the muscle and outer conjunctival flap. v. MITTELSTADT.

JAVAL (5) discourses on the history of strabismus, the development of the various kinds, their course and treatment.

1. LLOYD, OWEN. Hereditary nystagmus. *Ophth. Rev.*, July, 1882.

2. BENSON. On a case of voluntary nystagmus. *Ophth. Hosp. Rep.*, vol. x, p. 343.

3. DRANSART. Le nystagmus et l' héméralopie chez les mineurs. *Ann. d' ocul.*, vol. lxxxviii, p. 150.

LLOYD, OWEN, (1) could prove heredity in one case of nystagmus.

According to DRANSART (3) nystagmus consists in a paresis of the muscles and nerves of the eye due to nervousness. There is no central cause. Nutritive

disturbances and poor illumination are of only secondary consequence in its etiology. v. MITTELSTADT.

BENSON (2) reports the case of a young lady of twenty-four, who voluntarily could produce nystagmus. FITZGERALD.

1. KAHLER and PICK. The localization of partial paralysis of the oculomotor nerve. *Prager Zeitschr. f. Heilk.*, vol. ii, p. 301.

2. ROSENSTEIN. Total paralysis of all the muscles of the eye of cerebral origin. *Inaug. Dissert.*, Breslau, 1882.

3. RAVÀ. Contributo allo studio della paralisi dei nervi dell' occhio. Casuistica clinica. *Ann. d' ottalm.*, vol. xi, fasc. 2 and 3.

In a workman who had suffered from partial paralysis of the oculomotor nerve, KAHLER and PICK (1) found the right posterior cerebral artery converted into a firm, solid cord to the extent of 4½ *mm.*, and the right pedunculus cerebri, especially the pes, swollen und soft. The authors believe that in man the pupillary fibres of the oculomotor nerve lie in its anterior root fascicles, those of the external muscles of the eye in the posterior fascicles.

ROSENSTEIN (2) describes a case of total paralysis of all the muscles of the eye, of cerebral origin.

RAVÀ (3) describes the case of a young man of twenty, with complete paralysis of the six muscles of the eye and the levator palpebræ; the sphincter iridis alone was not affected. The power of accommodation could not be tested. The eye was slightly turned downward and inward, and could not be moved from this position. Although the disease had been preceded by a long-continued attack of intermittent fever, combined with severe headache, the author had to exclude a cerebral cause on account of the intact movement of the iris, and designate the paralysis as simply rheumatic. Complete recovery after six weeks of electric treatment. DANTONE.

1. ANGELUCCI. Affezione dolorosa del' nervo sopraorbitale. Nevrotomia. Guarigione. *Quadri statistici e frammenti d' oftalmologia.* Roma, 1882.

2. BURSAUX. De la resection du nerf sous-orbitaire dans la nevralgie faciale rebelle. *Thèse de Paris*, 1882.

3. FILATOW, PETER. A case of intermittent neuralgia, with retinal irritation. *Medizinskoje Obosrenije*, July, 1882, p. 71.

4. BADAL. L' élongation des nerfs et de ses applications au traitement de la nevralgie du trijumeau. *Gaz. d' ophth.*, No. 5, 1882.

5. BAMBDON. Nerve-stretching for supraorbital neuralgia, with remarks on nerve-stretchings and their bearing on the mode of transmission of nerve-impulses. *The Lancet*, No. 4. July, 1882, p. 138.

6. ALEXANDROFF. Contribution à l' étude de l' élongation des nerfs craniens. *Arch. d' ophth.*, vol. ii, No. 4.

ANGELUCCI. (1) performed neurotomy of the supraorbital nerve with good result in a case of intermittent neuralgia which had lasted two years. The accompanying megrim, as also the spasm of accommodation and of the orbicularis muscle, disappeared very soon after the operation. DANTONE.

FILATOW (3) reports a case of intermittent quotidian neuralgia between the brows and in the lid, accompanied by extreme photophobia, cured by quinine. HIRSCHMANN.

BADAL (4) stretched the supra- and infra-orbital nerves in the cases of two women with neuralgia of the fifth nerve, paralysis of the oculomotor, and atrophy of the optic nerve. The success was very moderate. v. MITTELSTADT.

ALEXANDROFF (6) stretched the supraorbital nerve in a very nervous man of thirty-one, who suffered from severe blepharospasm on both sides, tic douloureux, and hyperæsthesia of the skin of the face. On the right side of the brow there were old scars. On the right side complete success was obtained, on the left marked improvement. v. MITTELSTADT.

V.—ORBIT AND NEIGHBORING CAVITIES.

1. HUBER. Clinical contributions to the knowledge of orbital tumors. *Inaug. Diss..*, Zurich, 1882.

2. HULKE. Osteoma of the orbit. *The Lancet*, No. 22.

3. PEYROT. Sur une observation de tumeur de l' orbite. *Bullet. et mém. de la soc. de chir.*, vol. viii, 4.

4. TWEEDY. On a case of ivory exostosis of the orbit. *Ophth. Hosp. Rep.*, vol. x, p. 303.

5. REID. Enchondroma of orbit. *Brit. Med. Jour.*, April, 1882, p. 615.

6. DUFAIL. Des sarcomes de l' orbite et de leur traitement par l' extirpation des parties molles. *Thèse de Paris*, 1882.

7. SALTINI. Cisti orbitaria. Ussernazione clinica. *Gazz. d' ospidali*, Nos. 31 and 32, April, 1882.

8. CARRÉ. Kystes dermoides périorbitaires. Observation d' un kyste de la tête du sourcil. *Gaz. d' ophth.*, No. 8, 1882.

9. NETTLESHIP. Serous cystic tumor in eyebrow. *Trans. Oph. Soc. of the Unit. Kingd.*, vol. ii, p. 251, 1882.

10. LAWSON. Hydatid tumor of orbit. *Ophth. Hosp. Rep.*, vol. x, 3, p. 301.

11. ELONI. Étude clinique et anatomique sur un cas d' angiome caverneux enkysté de l' orbite. Laboratoire de la clinique ophthalmologique de Lyon. *Arch. d' ophth.*, vol. ii, No. 3.

12. CAMUSET. Angiome caverneux capsulé de l' orbite. *Gaz. d' ophth.*, No. 6, 1882.

13. CAPDEVILLE. Angiome caverneux de l' orbite. Marseille, 1882.

14. PEVOT. Angiome fibreux de l' orbite. *Gaz. hebd. de méd. et de chir.*, Feb. 7, 1882.

15. WEISS. Tumeur pulsatile de l' orbite ; ligature de l ' artère primitive ; guérison. *Rev. d' ocul. du sud-ouest*, vol. iii, 4, p. 97.

16. POLLAK. Monocular exophthalmus. *St. Louis Med. and Surg. Jour.*, vol. xliii, 4, p. 441.

17. PEÑA, A. de. Hydatidic tumor of the orbit (Echinococcus). *La oftalmologia práctica*, April, 1882.

18. BARABACHEW, P. Echinococcus in the orbit. (From the ophthalm. clinic of Prof. Hirschmann in Charkow.) *Wratsch*, No. 19, 1882.

19. SKLIFASSOWSKY. Pulsating exophthalmus; arterio-venous aneurism of right internal carotid; ligature of the common carotid. *Wratsch*, No. 13, 1882.

20. BULL. Lesions of the orbital walls and contents due to syphilis. *New York Med. Jour.*, August, 1882.

21. GALEZOWSKI. Des affections scrofuleuses de l' œil et de l' orbite. *Jour. de thér.* 1882, No. 3.

22. NETTLESHIP. Case of orbital cellulitis. *St. Thomas' Hosp. Rep.*, vol. xi, 1882.

23. POST, G. E. Case of exophthalmus with blindness. *The Lancet*, May 6, 1882.

24. LOVERDO. Des fractures du plancher de l' orbite siégeant surtout au niveau sous-orbitaire. *Thèse de Paris*, 1882.

25. WEINBERG. Exophthalmie à la suite des dents cariés. *Rec. d' ophth.*, vol. iii, No. 7, p. 441.

26. RAMPOLDI, R. Un caso di tenonite primitiva. *Ann. d' ottalm.*, May, vol. xi, p. 170.

27. LIPPINCOTT. Abscess of the orbit. *New York Med. Rec.*, 1882, p. 550.

28. HEYL, A. G. Some thermometric observations in a case of traumatic diphtheria of the orbit. *Phil. Med. Times*, July 29, 1882.

29. CHAUVEL. Des amblyopies traumatiques. Hémiopie horizontale de l' œil droit suite d' un coup de fleuret à l' angle interne de l' orbite. *Gaz. hebd. de méd. et chir.*, Feb. 10, 1882.

HUBER (1) publishes two cases of bony exostosis and one case of syphiloma of the roof of the orbit, one of adenoma in the orbit, one of a round-cell sarcoma beginning in the right lachrymal gland, one of a spindle-cell sarcoma of the same origin, and one of a congenital dermoid cyst of the orbit. The majority of these cases were operated upon. They proved that tumors which generally are considered very dangerous may be removed with the best results, and that enucleation, besides, is necessary in only the worst cases. One eye, which had undergone considerable changes, recovered its normal condition and functions to an unexpected degree. The results of the operation seemed to indicate that a number of anomalies of structure and function of the globe are due to simple mechanical influences.

In a girl of four, HULKE (2) removed an osteoma springing from the floor of the orbit. NETTLESHIP.

In a man of twenty-five, TWEEDY (4) found an ivory exostosis which occupied the upper and inner part of the orbit, and had its origin in the region of the lachrymal sac. The autopsy showed that the tumor extended into the frontal sinus. The latter was so distended by it that the anterior lobe of the cerebrum had been displaced. The tumor also penetrated into the nasal cavity and into the sphenoid bone; here it had caused a basilar meningitis. FITZGERALD.

In a young man of nineteen, REID (5) removed a tumor of the outer wall of the orbit. It adhered to the periosteum and extended back as far as the optic foramen and completely enclosed the lachrymal gland. Five months later the tumor had again formed, and was again removed. Microscopic examination showed it to be an enchondroma. FITZGERALD.

In a man of forty-seven, SALTINI (7) observed a cyst in the right orbit. The globe projected 1 *cm.*, was turned downward, and immovable. The fundus showed the usual symptoms of stasis. The cyst was cured by drainage. It contained crystals of cholesterine and hæmatoidine, and blood-, pigment- and fat-corpuscles. Saltini considered the cyst to be an acquired one, to be of a serous kind, and to have perhaps sprung from the mucous sac lying between the tendon of the superior rectus and levator palpebræ. DANTONE.

In a man of twenty, CARRÉ (8) extirpated a dermoid cyst the size of a pigeon's egg from the upper part of the orbit. The tumor, though scarcely visible, had been observed at the age of one and a half years. v. MITTELSTÄDT.

NETTLESHIP (9) saw a large oval cyst at the orbital margin near the eyebrows. When punctured a thin yellowish liquid escaped which soon formed again. By injecting tincture of iodine the tumor was reduced one half. FITZGERALD.

LAWSON (10) describes a cystoid tumor. The patient had complained of diplopia for seven or eight years, until sight was almost destroyed. Exophthalmus then gradually formed. Lawson removed the tumor; recovery without accident. FITZGERALD.

ELONI (11) removed an encapsuled cavernous angioma of the right orbit the size of a hazel-nut, which had developed in a woman of fifty-two, in the course of three years, after a painful inflammation of the eye, as she stated. There was moderate exophthalmus. The tumor lay under the right external rectus, so that tenotomy was necessary in order to detach it from its base. Eight days after the operation the optic disc appeared white and the blood-vessels thin. Eloni attributes these symptoms to hemorrhage into the sheath of the optic nerve and to division of some ciliary nerves. v. MITTELSTADT.

In a man of thirty-two, CAMUSET (12) observed the development of right-sided exophthalmus in the course of a year, accompanied by symptoms of inflammation and diplopia; it increased during the following eight years, sometimes increasing, sometimes diminishing. The outer canthus was split and the conjunctiva incised, when after dividing the orbital fascia a round tumor became visible, which could easily be detached from its attachments to the external wall and apex of the orbit. The lachrymal gland was removed with it. Recovery within a week. The tumor proved to be an angioma. v. MITTELSTADT.

PEÑA (17) reports an echinococcus of the orbit.

BARABACHEW (18) observed the sudden development of exophthalmus in a peasant girl of twelve; motility was checked in every direction; the cornea necrotic. Upward and inward of the globe there was a tumor adhering to the periosteum, which did not fluctuate and made the impression of a firm neoplasm. Besides amaurosis there was severe headache. The tumor had been growing for a year. The eye was enucleated, and an echinococcus-tumor removed of the size of a walnut. HIRSCHMANN.

In a man of forty-five, SKLIFASSOWSKY (19) found œdema of the lids and conjunctiva, exophthalmus, wide pupil, and a subjectively and objectively audible murmur; the cornea was dull; V — 0; and the eye immovable. The sound eased when the carotid was compressed, but the exophthalmus remained. Digital compression was tried for a week, but failed. All the symptoms, however, disappeared after ligating the common carotid artery. Amaurosis continued cand opacity of the lens developed. HIRSCHMANN.

In a syphilitic person, BULL (20) saw periostitis and gummata of the orbit, hyperostosis of several bones, and limited caries. BURNETT.

NETTLESHIP (22) reports two cases of inflammation of the orbital tissue. NETTLESHIP.

POST (23) saw exophthalmus, together with amaurosis, due to necrosis of the wing of the sphenoid bone. After the necrotic piece of bone had been removed the exophthalmus disappeared. NETTLESHIP.

WEINBERG (25) reports the clinical history of a case of exophthalmus which disappeared after the extraction of a carious tooth. MARCKWORT.

RAMPOLDI (26) observed a case of primary tenonitis, which began with chemosis, exophthalmus, and complete immobility of the eye, sight remaining intact. Later, exudative choroiditis set in, destroying vision. The symptoms of irritation disappeared after the conjunctiva had ruptured at the insertions of the superior, internal, and inferior rectus muscles and a quantity of thin pus had been discharged. DANTONE.

HEYL (28) reports a case of enucleation for melanosarcoma. Diphtheritic inflammation of the remaining conjunctiva followed, during which the temperature in the orbit rose to 100°. BURNETT.

1. FITZGERALD, C. E. On unilateral exophthalmus and the value of the sign by von Gräfe as characteristic of Graves' disease. *Trans. Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 233, 1882.

2. SANSON. Case of exophthalmus, with none of the cardiac and thyroid phenomena of Graves' disease. *Trans. Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 241, 1882.

3. NEPREN. Goître exophthalmique. *Soc. de chir.*, April 12, 1882.

4. BERNARD. Contribution à l' étude du goître exophthalmique. *Thèse de Paris*, 1882.

FITZGERALD (1) reports four cases of Graves' disease, two men and two women. In one case the exophthalmus of the second developed only gradually. The picture of the disease was incomplete in every case, and it is especially interesting that the symptom mentioned by von Gräfe, the imperfect mobility of the upper lid when looking down, was observed only on the side on which there was exophthalmus. FITZGERALD.

In a man of forty-one, with Graves' disease, SANSON (2) found slight pulsation whenever he became excited. The heart appeared normal, the tension of the arteries reduced. The degree of exophthalmus was extraordinary. No mention is made of von Gräfe's symptom. His condition was improved by the use of digitalis and galvanization of the cervical ganglion. FITZGERALD.

KÖNIG, EMIL. On empyema and hydrops of the frontal sinus. *Inaug-Diss.*, Berne, 1882.

Empyema and hydrops had caused a considerable swelling of the frontal sinus.

VI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

1. BRACHET. Conjonctivites simples, leur nature, leur traitement. *Rec. d' ophth.*, vol. iii, No. 7, p. 410.

2. BAYER. On Credé's procedure for the prevention of blennorrhœa neonatorum. *Arch. f. Gynæk.*, vol. xix, p. 258.

3. HORNER. On the prophylaxis of blennorrhœa neonatorum. *Correspondenzbl. f. Schweiger Aerzte*, 1882, No. 7.

4. PAULSEN. The application of the cold douche in blennorrhœa neonatorum. *Berl. klin. Wochenschr.*, No. 21. 1882.

5. ARMAIGNAC. Etiologie et traitement de l' ophthalmie purulente chez les nouveau-nés et les adultes. *Rev. d' ocul. du sud-ouest*, vol. iii, Nos. 6 and 7.

6. KÖNIGSTEIN. The prophylaxis of blennorrhœa neonatorum. *Arch. f. Kinderheilk.*, vol. iii, Nos. 9 and 10.

7. RUTE, NARAJO Y. Las discusiones sobre la peritomia en la conjunctivitis blennorrhagica. *Ophthalm. pratica*, anno i, No. 6, p. 126.

8. BADER. The treatment of gonorrhoic ophthalmia. *The Lancet*, No. 15.

9. NETTLESHIP. Destructive ophthalmitis in children. *The Lancet*, No. 16.

10. CARRÉ. Apropos du traitement de la conjonctivite purulente des nouveau-nés. *Gaz. d' ophth.*, No. 10, 1882.

11. WECKER. Prophylaxe de l' ophthalmie des nouveau-nés. *Gaz. des hôp.*, April, 1882.

12. BAILLY. Traitement de l' ophthalmie purulente des nouveau-nés. *Gaz. des hôp.*, February, 1882.

13. ABADIE. Traitement de la conjonctivite blennorrhagique. *Gaz. des hôp.*, April, 1882.

14. BRAME. Deux cas particuliers d' ophthalmie purulente chez des adultes. *Gaz. des hôp.*, September, 1882.

15. MEYER, S. Ophthalmo-blennorrhœa neonatorum. *Hospitals tidende*, June 21, 1882.

16. KRAUSE. The micrococci of blennorrhœa neonatorum. *Centralbl. f. prakt. Augenhk.*, 1882, p. 134.

17. LUBRECHT. The treatment of blennorrhœa neonatorum et gonorrhoica. *Centralbl. f. prakt. Augenhk.*, 1882, p. 248.

18. DRANSART. Conjonctivite purulente et conjonctivite catarrhale par cause rhumatismale. *Ann. d' ocul.*, September and October, 1882.

19. LANDESBERG. Diphtheria of the conjunctiva. *Med. Bull.*, vol. iv, No. 5.

20. TORO, DEL. Observations sur un nouveau cas de conjonctivite diphthérique. *Rev. d' ocul. du sud-ouest*, vol. iii, No. 4, p. 81.

21. FONTAN. Un cas d' ophthalmie diphthéroide. *Rec. d' ophth.*, No. 9, p. 520.

22. BARETTE. Contribution à l' étude de l' ophthalmie diphthérique et de son traitement. *Arch. d' ophth.*, vol. ii, No. 2.

23. MOOREN. *Five lustra of ophthalmological practice*, p. 87.

24. KNAPP. On croup of the conjunctiva, with remarks on the treatment of the contagious forms of conjunctivitis. These ARCHIVES, vol. xi, p. 1, etc. *Arch. f. Augenhk.*, vol. xii, p. 61.

25. CRITCHETT, A. and Jules. Chronic membranous inflammation of the conjunctiva. *The Lancet*, No. 16.

BRACHET (1) discusses conjunctivitis in general, and calls attention to the necessity of treating co-existent affections of the cornea, the lachrymal apparatus, etc. He speaks besides in particular of phlyctenular and lachrymal conjunctivitis. The latter name Galezowski has applied to a form of conjunctivitis produced and kept up by stenosis of the lachrymal duct. MARCKWORT.

BAYER (2) has employed Credé's procedure for the prevention of blennorrhœa neonatorum, the instillation of a two-per-cent solution of nitrate of silver, in the Lying-in Institute at Stuttgart, and in consequence did not see a single case among 361 children.

HORNER (3) has treated 468 cases of blennorrhœa of the new-born in the course of twenty-two years. In 122 there were severe inflammations of the cornea; in 35 it had already perforated; in 38 the cornea became affected during treatment. Of the last-mentioned, 14 healed without producing maculæ of consequence. Horner is opposed to the procedure of Credé and to cleansing the eye with a two-per-cent solution of carbolic acid in private practice, as the midwives pour the solution directly into the eye and cauterize the cornea. The midwives, however, should be forced to observe the precautions necessary to prevent blennorrhœa of the new-born, by irrigation of the vagina of the mother, by cleansing the instruments and hands, and to give immediate notice in case the eyes become affected.

PAULSEN (4) employs the cold douche in blennorrhœa of the new-born with good result.

KÖNIGSTEIN (6) first observed 1,092 children of whom 4.76% were affected with blennorrhœa. 1541 children were then treated according to Hausmann's procedure, 2% of whom became affected. Of 1,300 children treated according to Credé, only ½ % became affected.

RUTE (7) employed Arlt's method of circumscision of the chemotic conjunctiva in blennorrhœa with good result.

CARRE (10) advocates the use of nitrate of silver above all, even in the beginning of blennorrhœa.

In blennorrhœa, both of new-born and of adults, ABADIE (13) cauterizes the conjunctiva from the first day of inflammation with a 3-4% solution of nitrate of silver every 12 hours. Ice-applications must be made besides, if possible, together with a solution of boracic acid.

BRAME (14) saw rapid recovery in the incipient stage by using iodide of silver.

MEYER (15) gives the percentage of blennorrhœa of the new-born in the Lying-in Hospital at Copenhagen. He recommends Credé's procedure as the best preventive.

KRAUSE (16) succeeded in obtaining the micrococci of blennorrhoic pus by impregnating mutton blood-serum with it and treating it in the moist chamber and the incubator. They are always attached to each other in the secretion in dumb-bell shape. The result of inoculation of animals with the pure material was negative, in a new-born rabbit only profuse suppuration of the conjunctiva set in.

LUBRECHT (17) cleansed the eyes daily, both in blennorrhœa of the new-born and gonorrhoic ophthalmia, with a dilute solution of corrosive sublimate. Although this did not check the disease, it had a beneficial influence on its course.

DRANSART (18) reports a case of unilateral purulent conjunctivitis of rheumatic origin. (It is doubtful whether it was not produced by infection.—REP.)

MARCKWORT.

In a girl of fifteen DEL TORO (20) observed the rapid development of a tumor of the lids of considerable size, followed by rapid hardening. A small quantity of viscid liquid was discharged, which dissolved in the tears but inflamed the skin of the cheeks. Toro diagnosticates diphtheritic conjunctivitis in the stage of fibrous infiltration. Improvement was rapid under energetic treatment in the course of five days.

According to FONTAN'S (21) investigations, fibrino-purulent pseudo-membranes are formed in purulent conjunctivitis; in diphtheritic conjunctivitis, pseudo-membranes of epithelial origin. Based on the clinical history of a case Fontan sets up a third form, which he calls diphtheroid conjunctivitis. The membrane which forms in this disease contains, among other elements, tissue of the conjunctiva, but not the deformed epithelial formations characteristic of diphtheria.

MARCKWORT.

In discussing the clinical history of diphtheritic conjunctivitis, BARETTE (22) mentions as unusual symptoms the partial loss of the lashes and ptosis. The latter, observed twice in ten cases, partially disappeared and must be considered as diphtheritic paralysis. The lashes partly fell out in all cases and did not come again. Barette treats diphtheria with warm cataplasms; instead of scarification, he energetically removes the membranes. In some cases the subcutaneous injection of pilocarpine seems to have been of benefit.

V. MITTELSTADT.

In the first stage of diphtheritic conjunctivitis, MOOREN (23) used lukewarm applications with excellent result; in the second, which is introduced by suppuration accompanying and following the discharge of the membranes, the mitigated nitrate of silver stick was successfully employed.

KNAPP (24) defines the nature of the croupous process as follows: It differs from the diphtheritic affection by the softness, the absence of heat and swelling of the lids, the superficial attachment and easy removal of the croupous membrane, the appearance of the mucous membrane and the lid itself under it, by the relative immunity of the cornea and the tendency to papillary proliferations. The croupous membrane covering the papillary body is rapidly renewed when removed; in contradistinction to diphtheria it never attacks the conjunctiva of the globe, and rarely the cornea.

CRITCHETT and JULES (25) also report on diphtheritic conjunctivitis.

1. HORNER. The follicular inflammation of the conjunctiva. *The diseases of the eye in childhood*, p. 305.

2. NUEL. Des glandes tubuleuses pathologiques dans la conjunctive humaine. *Ann. d' ocul.*, July-Aug., 1882. *Ann. et bull. de la soc. de méd. de Gand*, June, 1882.

3. HEISRATH. The treatment of granular conjunctivitis by deep and extensive incisions. *Berlin. klin. Wochenschr.*, Nos. 28, 29, and 30.

4. BLANCHE, J. AGUILAR. The excision of the semilunar fold in granulations. *Revista de ciencias medicas*, Barcelona, March, 1882.

5. VENNEMANN. Les complications du trachome. *Rev. méd. Louvain.*

6. DRUSCHININ. Statistics on the etiology of trachoma. *Milit. med. Journ.*, Jan., 1882.

7. MINOR. Boracic acid for granular lids. *N. Y. Monthly R.*, Feb., 1882.

8. ABADIE. Quelques mots à-propos du traitement de la conjonctivite granuleuse. *Ann. d' ocul.*, May, June, Sept., Oct., 1882.

9. MOOREN. *Five lustra of ophthalmological practice*, p. 92.

10. DIANOUX. De l' ophthalmie purulente provoquée comme moyen thérapeutique. *Progr. méd.*, No. 41, p. 771.

11. SEDAN. Au sujet de la cure possible de la conjonctivite granuleuse chronique par inoculation purulente. *Rev. d' ocul. du sud-ouest*, vol. iii, No. 9.

12. VILFROY, ALBERT. Du pannus et son traitement par inoculation blennorrhagique. Lille, 1882.

13. WECKER. L' ophthalmie purulente factice produite au moyen du Jequirity ou liane à réglisse. *Ann. d' ocul.*, 1882, July-Aug.; *Rev. d' ocul. du sud-ouest*, vol. iii, No. 9, p. 192.

14. MOURE. L' oftalmia purulenta artificiale prodotto dal Jequirity. *Bollet. d' ocul.*, vol. v, No. 3, p. 91.

HORNER (1) describes as follicular inflammation of the conjunctiva (follicular catarrh, follicular trachoma, granular trachoma, chronic granulations), not the presence of a few pale granules in the lower fornix and near the outer commissure, something not uncommon in normal eyes and in mild forms of catarrh, but the chronic and acute development of granulations *en masse*. In all varieties of conjunctivitis in which the development of follicles is the most noticeable change, there is a lymphoid infiltration, which assumes the form of a well-defined follicle, the more slowly it set in and adapted itself to the resistance of the tissues, but loses it in proportion to the intensity of the inflammation. The infiltration around the deeper blood-vessels is of the greatest importance in its consequences. These granulations may disappear without producing any permanent changes, but the process is generally of very long duration. In the mild forms of follicular inflammation the disease lasts much longer, but can be cured with certainty. If, however, the inflammation is intense, as individually or corporately may be the case, and circumstances do not admit of a change, the results are grave: small ulcers form at the margin of the cornea; or small, round infiltrations, resembling eczema or marginal pannus, develop, while the inflammation of the conjunctiva itself can only be reduced very slowly, the results of the diffuse inflammation blending with those of the follicular development. Chronic follicular catarrh may be cured by the strict observation of hygienic measures, fresh-air exercise, ventilation of the bedroom, etc. No energetic treatment of the conjunctiva should be attempted. In the more severe forms, salves of

acetate of lead or sulphate of copper are indicated. In acute, diffuse inflammation of a follicular character energetic local treatment should be avoided in the beginning, and hygienic measures only made use of; when the secretion becomes more profuse, nitrate of silver may be used. If the cornea becomes affected, eserine should be instilled and an antiseptic bandage employed.

NUEL (2) discusses the glandular formations found by Kuhnt in the human conjunctiva, and concludes that they are genuine tubular glands, in opposition to the opinion that they are the result of proliferation of the papillæ. In agreement with Jacobson, he does not see in them any thing peculiar to trachoma.
MARCKWORT.

HEISRATH (3) recommends deep incisions in trachoma.

AGUILAR BLANCH (4) excises the semilunar fold when covered with granulations.

DRUSCHININ (6) describes the prevalent views as to the etiology of trachoma, and tries to prove by statistics that dampness of the dwellings and its consequences is the essential cause of its development. HIRSCHMANN.

MINOR (7) recommends the use of boracic acid in form of powder in trachoma, especially in fresh granulations. BURNETT.

According to Abadie (8), the inoculation of blennorrhoic pus is only indicated in trachoma when the conjunctiva is still really inflamed, but not when the inflammation is over, the conjunctiva atrophic, and the cornea thin, leucomatous or staphylomatous. MARCKWORT.

In inveterate pannus MOOREN (9) inoculates blennorrhoic pus without fear, as a reliable means of obtaining a cure. The secretion obtained from an otherwise healthy new-born child affected with blennorrhœa is the best.

VILFROY (12) advises the inoculation of blennorrhoic pus in dense pannus of both eyes only, as there is then no danger to the cornea. MARCKWORT.

WECKER (13) was informed by a gentleman who formerly had suffered from trachoma, that he had obtained an excellent result in himself by the use of Jequirity (abrus precatorius). This substance is used in Brazil for trachoma with excellent results. Wecker makes use of it in diphtheria, granulations and pannus of long standing, in order to produce rapid suppuration. A great advantage is that its action can be dosed. Experience must show whether or not it acts advantageously upon the ulcerous processes of the cornea.

MOURE (14) also experimented with Jequirity.

1. DEUTSCHMANN. Iodoform in ophthalmology. *Arch. f. Ophth.*, vol. xxviii, p. 214.

2. MOOREN. *Five lustra of ophthalmological practice*, p. 94.

3. SMITH, PRIESTLEY. A case of gonorrhoic ophthalmia rapidly cured by iodoform. *Ophth. Rev.*, May 1, 1882.

4. GROSSMANN. Note on the iodoform treatment of blennorrhœa neonatorum. *Ophth. Rev.*, vol. i, pp. 141 and 214.

5. DUJARDIN. A case of blennorrhœa cured by iodoform. *Ophth. Rev.*, Sept., 1882.

6. FISCHER. Iodoform in ophthalmology. *Mitth. d. Vereins d. Aerzte in Steiermark*, Vienna, 1881.

7. SCOTT. Diphtheritic conjunctivitis treated with iodoform. *Boston Med. and Surg. Journ.*, July, 1882, p. 16.

8. SCHINDLER. Iodoform in ophthalmology. *Aerztl. Intelligenzbl.*, 1882, Nos. 28 and 29.

9. SCHENKL. Iodoform. *Prager med. Wochensch.*, vol. vii, Nos. 38, 39, and 40.

10. MACONSHIC. Iodoform in purulent ophthalmia. *Oph. Rev.*, vol. i, No. 10, 1882, p. 271.

11. MILLES. Iodoform in purulent ophthalmia. *Ophth. Hosp. Rep.*, vol. x, 3, p. 386.

12. GALEZOWSKI. De l' iodoform dans les affections oculaires. *Rec. d' ophth.*, June, 1882.

13. FOURGUETTE. Essai sur l' emploi thérapeutique de l' iodoform en oculistique. *Thèse de Paris*, 1882.

14. KANZAURO. The importance of iodoform in ocular affections. *Wratsch*, No. 42.

DEUTSCHMANN (1) uses iodoform in solid form, as a powder and as a salve, and saw injuries of the cornea heal well after dusting it into the eye. It also acted beneficially in operative wounds. It failed in ordinary conjunctival catarrh, blennorrhoic affections, and granular conjunctivitis, but proved very effective in the serpent ulcer of Sæmisch.

MOOREN (2) saw trachoma disappear after using iodoform, which he rubbed upon the lids in form of collodium (5:30), or brought in contact with the conjunctiva in form of a salve (0. 15:10).

PRIESTLEY SMITH (3) treated a case of gonorrhoic ophthalmia with iodoform. Improvement was so rapid that the patient was discharged after a week.

FITZGERALD.

GROSSMANN (4) used iodoform in form of a powder in purulent conjunctivitis. It must be reduced to an impalpable powder, otherwise it irritates the cornea mechanically.

DUJARDIN (5) also obtained good results with iodoform in a severe case of purulent ophthalmia in a child of 8 months. FITZGERALD.

MACONSHIC (10) also recommends it.

MILLES (11) used iodoform in form of a powder and of a salve, and found it effective when used in the beginning of the affection. He treated gonorrhoic ophthalmia with it, but combined with it the use of boracic acid and ice-applications. It also acted beneficially in corneal infiltrations. FITZGERALD.

GALEZOWSKI (12) made use of a salve of iodoform (1:10) with good results in a case of croupous conjunctivitis, in which all other means had failed. He introduced it in large quantities into the conjunctival sac. MARCKWORT.

FOURGUETTE (13) recommends iodoform salve in blennorrhœa, croupous conjunctivitis, dacryocystitis, and the parenchymatous affections of the cornea, especially the scrofulous ones. V. MITTELSTADT.

SCHENKL (9) made use of iodoform in form of a salve or as iodoform-collodium. It did not produce any better results in blepharitis and phlyctænular oph-

thalmia than the treatment generally adopted, though it proved useful. In trachoma and interstitial keratitis the results were much poorer, but did good service in chalazia, phlyctænular pannus, serpiginous corneal ulcers, injuries of the cornea, and lachrymal affections.

FISCHER (6) used iodoform as a powder, as gelatine-bacilli, and as an almond solution. He recommended it in scrofulous and trachomatous pannus, in lachrymal affections and as an antiseptic in operations. He also found that it stimulated granulation and caused rapid regeneration of the epithelium. In blennorrhœa and trachoma the present methods of treatment were more effective.

1. HOTZ. Bad results of dusting calomel into the eye. These ARCHIVES, vol. xi, p. 49. *Arch. f. Augenheilk.*, vol. xi, p. 400.

2. ROCKLIFFE. A case of acute conjunctivitis caused by the electric light. *The Lancet*, No. 8.

3. GALEZOWSKI. De la xérophthalmie parenchymateuse et de son traitement par la transplantation de la conjonctive du lapin. *Rec. d' ophthal.*, April, 1882.

4. REICH. On pemphigus of the conjunctiva. *Wratsch*, No. 19; *Centralbl. f. pract. Augenheilk.*, 1882, p. 145.

5. STOCQUART. Note sur l' emploi de l' acide borisque dans les affections externes de l'œil. *Ann. d'ocul.*, vol. lxxxvii, May, June, 1882, p. 221.

HOTZ (1) reports a case in which calomel was dusted into an eye affected with recent rheumatic iritis, producing severe chemosis of the conjunctiva and cauterizing it where it came in contact with it.

ROCKLIFFE (2) observed lachrymation, photophobia, pain and swelling of the lids in a workman whose eye had been exposed to an electric light of 3,000 candlepower. All of these symptoms developed in the course of fifteen minutes. FITZGERALD.

GALEZOWSKI (3) mentions a case of xerosis of the conjunctiva, in which both lower lids were united throughout their whole extent to the conjunctiva of the globe to within 2 *mm.* of the corneal margin. The left lower lid was detached and a conjunctival flap transplanted from a rabbit. The result was satisfactory. MARCKWORT.

REICH (4) is of the opinion that those cases which are generally described as essential xerosis of the conjunctiva and degenerative syndesmitis, are probably the result of a more or less severe pemphigus of the conjunctiva, in which the affection of the skin was overlooked in the anamnesis. HIRSCHMANN.

STOCQUART (5) reports 3 cases of blepharitis ciliaris, 7 of conjunctival catarrh, 14 of phlyctænular, and 2 of purulent conjunctivitis, all of which were successfully treated with preparations of boracic acid. MARCKWORT.

1. HARDER. On the knowledge of pterygium. *Mitth. a. d. Königl. Univ.-Augenklinik zu. München*, vol. i, p. 247.

2. v. REUSS. Pinguecula. *Eulenburg's Real.-Encyclop. f. d. ges. Med.*, vol. x, p. 652.

3. BURNETT. Circumscribed hypertrophy of the conjunctiva (vernal catarrh). These ARCHIVES, vol. x, p. 414. *Arch. f. Augenheilk.*, vol. xi, p. 391.

4. GOLDZIEHER. Lymphadenitis of the conjunctiva. *Centralbl. f. pract. Augenhk.*, 1882, p. 321.

5. v. MILLIGAN. A case of tuberculosis of the conjunctiva. *Centralbl. f. pract. Augenhk.*, July, 1882.

6. HORNER. Tuberculosis of the conjunctiva. *The diseases of the eye in childhood*, p. 317.

7. DIMMER. A case of angioma of the conjunctiva. *Prager med. Wochenschr.*, vol. vii, Nos. 33 and 34.

8. GRIFFITH. Epithelioma of the conjunctiva. *Ophth. Rev.*, vol. I, No. 9, 1882, p. 245.

9. STREATFEILD. A congenital anomaly of the conjunctiva hitherto unreported. *The Lancet*, vol. ii, No. 9, September 2, 1882.

10. CRITCHETT. A case of bony tumor of the conjunctiva. *The Lancet*, No. 20.

11. ROBINEAU. Quelques variétiés de tumeurs malignes de la conjonctive. *Thèse de Paris*, 1882.

HARDER (1) anatomically examined two cases of pterygium. They showed the development of this anomaly, and furnished the anatomical substratum for Artl's theory that pterygium is due to the superposition of the swollen conjunctiva over a fresh but healing erosion of the cornea. The loss of the epithelium of the cornea is a *conditio sine qua non*, as is proven by the condition of the fibrillar connective band between the lacunæ. The advance of the pterygium toward the centre of the cornea is not merely a passive one, as proliferation of the substance filling the corneal defect takes place.

BURNETT (3) discusses vernal catarrh. It attacks especially children, and consists in a grayish-yellow nodular swelling of the conjunctiva with a well-defined edge toward the cornea; the nodules may appear singly, or they may surround the whole limbus of the cornea. The remainder of the conjunctiva of the globe is thickened, and in whites of a yellowish-red, in negroes of a brownish, color. Papillary excrescences of the tarsal part of the conjunctiva are also always found.

GOLDZIEHER (4) describes a case of lymphadenitis of the conjunctiva. In a boy of fourteen he removed a tumor the size of a hazel-nut from the fornix of the lower lid. It proved to be a conglomeration of lymphatic glands, which probably had developed from glandular follicles.

v. MILLIGAN (5) observed upon the conjunctiva of the lower lid a granulating excrescence the size of a pea, soft, of a light red color, and bleeding easily when touched, and attached to the conjunctiva by a thin pedicle. It was abscised, and proved to be a granuloma. Eleven months later several similar excrescences had developed which were removed with a sharp spoon.

HORNER (6) believes tuberculosis of the conjunctiva to be but one manifestation of a co-existent and similar affection of the lymphatic system of the same side. It is generally found upon the conjunctiva of the lids, rarely of the globe. The lid appears thickened; the conjunctiva is converted into a grayish-red, uneven, granulating mass. The disease always lasts a long time; decay slowly proceeds, while new granulations spring up; marginal ulcers and pannus of the cornea

may finally develop. The prognosis is not always bad; sometimes the disease gradually disappears, leaving but a few scars.

DIMMER (7) describes a dark red tumor, which extended from the limbus of the conjunctiva downward to the retrotarsal fold, on the nasal side to the semilunar fold, and on the temporal side to the middle between limbus and outer commissure. At this point it became so prominent that the lids, when closed, did not cover it completely. It was but loosely attached to the sclera, and did not interfere with the movements of the globe in the least. The tumor contained many fascicles, had a smooth, shining surface, felt soft, and could easily be compressed by the finger, but at once reappeared when it was removed. The tumor was ligated twice, when it gradually disappeared.

GRIFFITH (8) saw a grayish tumor which occupied the upper part of the conjunctiva and cornea. The eye was enucleated and the tumor found to be an epithelioma extending to the optic nerve.

STREATFEILD (9) describes an anomaly of the conjunctiva hitherto unrecorded, which extended in form of a horizontal ridge from the outer canthus to the corneal margin. NETTLESHIP.

1. HORNER. Keratitis interstitialis profunda. *The diseases of the eye in childhood*, p. 320.

2. MOOREN. *Five lustra of opththalmological practice*, p. 109.

3. AGUILAR BLANCH. Contribution à l' étude de la kératite interstitielle. *Rec. d' ophth.*, 1882,, vol. iii, No. 8, p. 457.

4. CARRE. Traitement des kératites. *Gaz. d' ophth.*, March, April, 1882.

5. ROBIN. De la kératite phlycténulaire marginale. *Thèse de Paris*, 1882.

6. DENTI. Di un singulare fenomeno pathologico di circolazione della cornea. *Gaz. del ospitale*, No. 22, Mar., 1882.

According to HORNER (1), diffuse interstitial keratitis (keratitis parenchymatosa, profunda, scrofulosa, syphilitica) occurs especially in children between the ages of five and sixteen. A grayish opacity spreads over the cornea, advancing from the periphery toward the centre, and becoming more and more dense. As the centre becomes opaque the periphery begins to clear up. As a rule, both eyes become affected, though not simultaneously, but at an interval varying from days to months. The disease always lasts a long time. Even in those cases which end well slight opacities of the cornea remain behind. The macroscopic changes alone of the cornea necessarily lead to the conclusion of a constitutional origin of the disease. While Mackenzie and Arlt designate just this form as scrofulous keratitis, Hutchinson has shown its connection with hereditary syphilis.

MOOREN (2) believes that interstitial keratitis is almost solely due to syphilis, and occurs in combination with the deformity of the teeth described by Hutchinson, although the latter is sometimes seen in non-syphilitic persons. The disease generally makes its appearance in childhood, though Mooren has also seen it in a number of persons of advanced age.

AGUILAR BLANCH (3) publishes a discussion of interstitial keratitis, mainly theoretically. MARCKWORT.

According to an observation of DENTI (6), severe supra-orbital neuralgia and pericorneal injection developed in a person of forty-two suffering from specific iritis and numerous synechiæ, whenever the eyes were strained by reading or writing; at the same time a blood-red spot the size of a millet seed developed in the corneal tissue, 3 *mm.* from its edge; it was completely isolated and separated from the limbus of the conjunctiva by an opaque but non-vascular portion of cornea. After a few minutes' rest a fine red thread was seen to extend from the spot to the corneal margin, through which the blood seemed to disappear in the course of two minutes, leaving a dark gray opacity. The whole phenomenon could be produced at will. All the symptoms disappeared after energetic anti-syphilitic treatment of eleven days; the neuralgia became less severe; after the first few days a milk-white spot appeared instead of the red, and finally the whole opacity cleared up. The author explains the phenomenon by supposing that blood, and later white blood-corpuscles were forced into the corneal lacunæ by increased intra-ocular pressure. DANTONE.

1. BARAQUER. Treatment of corneal ulcers. *Gaz. méd. Catalana*, Mar., 1882.

2. DORMAGEN. A case of rodent corneal ulcer. *Inaug. Diss., Bonn*, 1882.

3. VERDESE, ANGE. Contribution à la thérapeutique de l' ulcère serpigineux de la cornée. *Arch. d' ophth.*, vol. ii, No. 2.

4. SIKORA. Ètude clinique sur le traitement des ulcères rongeantes de la cornée. *Thèse de Paris*, 1882.

5. CARRE. De la cautérisation ignée de la cornée et de ses indications. *Gaz. d'ophth.*, 1882, No. 7.

6. MOOREN. *Five lustra of ophthalmological practice*, p. 105.

7. REINHARDT. Tension in the anterior chamber, and loss of substance of the cornea under atropine and eserine. *Inaug. Diss., Basel*, 1881.

In conjunctival affections BARAQUER (1) performs peritomy in order to prevent any participation of the cornea; it also prevents chemosis and pressure upon the cornea. He cures corneal ulcers by a boracic-acid bandage, and instillation of eserine.

According to ANGE VERDESE (3) the serpent ulcer is of a septic character. Any obstruction of the lachrymal passages may lead to it, as the septic substances are not washed away, or may make their way from the mouth and nose to the eye. Simple epiphora may macerate the epithelium and so lead to the formation of a serpent ulcer. Ange Verdese scrapes out the fundus and infiltrated edge of the ulcer and washes it with boracic-salicylic acid.

V. MITTELSTADT.

CARRE (5) cauterizes serpent ulcers.

In the forms of keratitis accompanied by hypopyon, MOOREN (6) practises splitting of the cornea according to Saemisch, with good results, besides applying a compressive bandage. Before the operation he cleanses the conjunctival sac several times with a dilute solution of salicylic or boracic acid.

1. WEINBERG. Quelques considérations sur les corps étrangers de la surface du globe oculaire. *Rec. d' ophth.*, May, 1882.

2. DUJARDIN. Des exsudats albuminoides à la suite des brulures superficielles de la cornée. *Rec. d' ophth.*, April, 1882.

3. MAGNUS, H. A splinter of glass borne two years and three months in the cornea of the left eye. *Klin. Monatsbl. f. A.*, vol. xx, p. 396.

In discussing the foreign bodies of the cornea and conjunctiva, WEINBERG (1) reports a case in which, in consequence of lead-poisoning, lead had been deposited in the substance of the cornea. MARCKWORT.

Sometimes exudations result from superficial burns of the cornea, which, according to DUJARDIN'S (2) experience, can be easily removed by massage, or, if left to themselves, by the action of the lids.

MAGNUS (3) removed from the cornea of a lady a splinter of glass 2 *mm.* long which had been lying between the lamellæ for two years and a quarter.

1. GAMA, PINTO DA. Anatomical examination of an eye operated for corneal staphyloma according to Critchett's method. *Arch. f. Ophth.*, vol. xxviii, 1, p. 187.

2. BALLERTI. Du staphylome pellucide et son traitement. *Prog. méd.*, Mar. 10, 1882, No. 10.

3. BENSON. Anterior staphyloma of the eyeball. *Dubl. Jour. Med. Sci.*, July, 1882, p. 78.

4. HIGGINS. On eight cases of conical cornea treated by elliptical excision. *Ophth. Hosp. Rep.*, vol. x, p. 316.

5. HORNER. Keratoglobus. *The diseases of the eye in childhood*, p. 339.

GAMA (1) made an anatomical examination of an eye which was enucleated for cyclitis sixteen years after Critchett's staphyloma operation. The conclusion must be drawn that Critchett's operation is not entirely without danger.

HIGGINS (4) excised an elliptical piece from the cornea in eight cases of keratoconus with satisfactory results. FITZGERALD.

HORNER (5) describes that form of keratoglobus as pure whose sharply defined boundary and absolute transparency have been determined by several observers. Later in life it may become important only by a change in the refraction and disposition to cataract. In pellucid keratoglobus the cornea appears hazy, the globe is very hard, the pupil of normal size and almost immovable. Eserine generally causes a temporary disappearance of the opacity. If an eye affected with turbid keratoglobus is left to its fate, the opacity comes and goes at varying intervals. The cornea constantly grows, the whole anterior segment of the globe is pushed forward by the distension of the pericorneal scleral zone. At the same time the excavation of the disc due to the increased tension becomes more and more apparent. The whole picture of turbid keratoglobus is that of glaucoma; the whole process may be set down as congenital glaucoma.

1. MOOREN. *Five lustra of ophthalmological practice*, p. 114.

2. ANDREWS. Gummous tumor of the sclera. These ARCHIVES, vol. xi, p. 458. *Arch. f. Augenheilk.*, vol. xii, p. 113.

3. v. REUSS. Scleritis. *Eulenburg's Real.-Encycl. d. ges. Med.*, vol. xii, p. 558.

4. KLEIN. Massage in ophthalmology. *Wiener med. Presse*, 1882, Nos. 10, 11, 12, and 15.

5. CARRE. Du massage de l'œil. *Gaz. d' ophth.*, No. 9, 1882.

MOOREN (1) found that far more women than men are affected with episcleritis. It is generally due to rheumatism and gout, but sometimes it is a complication of scleroderma, menstrual disturbances, and scrofula.

ANDREWS (2) saw a gummous tumor originating in the sclera, which disappeared under anti-syphilitic treatment.

KLEIN (4) employed massage of the eye in two cases of episcleritis—one of parenchymatous, and one of phlyctænular keratitis; Carré, besides in these diseases, in blepharitis ciliaris also.

1. LANDESBERG. A chip of iron ten years in the aqueous humor. *Klin. Monatsbl. f. A.*, vol. xx, p. 320.

2. SANTOS FERNANDEZ. Foreign body in the anterior chamber. *Cronica oftalmologica*, May, 1883.

3. HOLMES. An eyelash in the anterior chamber. These ARCHIVES, vol. x, p. 422. *Arch. f. Augenheilk.*, vol. xii, p. 90.

4. WILLIAMSON. Eyelashes in the anterior chamber of the eye, the result of a shot. *Lancet*, No. 12.

5. ATKEN. Large quantity of cholesterine crystals in the anterior chamber. *British Med. Jour.*, Feb. 4, 1882.

By a careful paracentesis of the anterior chamber, LANDESBERG (1) removed a chip of iron $\frac{1}{2}'''$ long, which had remained there for ten years without materially injuring sight.

SANTOS FERNANDEZ (2) mentions three cases of foreign bodies in the anterior chamber. In the first they consisted of three particles of stone, in the second a chip of iron, and in the third a particle of molten iron. In the first two cases the foreign bodies were removed by keratotomy combined with iridectomy, in the third by keratotomy alone.

HOLMES (3) and WILLIAMSON (4) extracted eyelashes from the anterior chamber. In Holmes' case the eyelash had caused traumatic cataract.

ATKEN (5) saw a large number of cholesterine crystals in the aqueous humor.

C.—IRIS AND UVEAL TRACT, GLAUCOMA, SYMPATHETIC OPHTHALMIA, REFRACTIVE MEDIA (LENS AND VITREOUS BODY), RETINA AND FUNCTIONAL DISTURBANCES, OPTIC NERVE, INJURIES, FOREIGN BODIES (PARASITES), OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

BY DR. A. NIEDEN.

I *a.*—IRIS.

1. ARLT. Case of tuberculosis of the iris. *Wiener. Med. Bl.*, No. 24, and *Sitz.-Ber. d. Ges. d. Aerzte*, p. 750.

2. BENSON, ARTHUR. Irideremia. Path. Soc. of Dublin. *British Med. Journ.*, May 6, 1882, p. 663.

3. BRAILEY and EDMUNDS. On a case of tuberculous disease of the iris. *Transact. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 269, 1882.

4. CARAFI, J. M. Monstre anencéphalique, présentant plusieurs vices de conformation. Colobome de la paupière inférieure et de l' iris à droite. *Soc. anat.*, séance de 23 Déc., 1881. *Le prog. méd.*, No. 32, 1882.

5. COME Y LANDA. Atresia pupilar considerable del ojo direcho, sintomàtica de una iritis parequimatosa. *Rev. espec. de oftalm.*, May, 1882. Cured by iridectomy.

6. EALES. Syphilitic iritis. *British Med. Journ.*, May 27, 1882.

7. EVERSBUSCH, O. Contributions to the development of the serous cysts of the iris. *Mitth. aus d. Königl. Univ.-Augenklin. zu München*, vol. i, pp. 1–36. Will be reported in the next number.

8. FUCHS. Melanoma of the iris. *Arch. f. Augenhk.*, vol. xi, p. 435. This number of the ARCHIVES.

9. HAAS, XAV. Report on 300 iridectomies performed in the Munich ophthalmic clinic, 1870–1880. *Mitth. aus d. Königl. Univ.-Augenkl. zu München*, vol. i, p. 72.

10. HOWE, LUC. Symptomatology of the pupil. ii, Pathological changes. *Buff. Med. Surg. Journ.*, vol. xxi, 11, p. 481. Nothing new.

11. MAYERHAUSEN. Contribution to the knowledge of albinism. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 191.

12. MOOREN. Case of pure gumma of the iris. 5 *Lustren opth. Wirksamkeit*, p. 133. Wiesbaden : Bergmann.

13. MOOREN. On syphilitic iritis, *l. c.*, p. 140.

14. MOYNE. Scollamento dell' iride. *Boll. d' ocul.*, vol. v, No. 1, Sept., 1882.

15. MULES, P. H. Case of tubercle of iris, choroid, and retina. *Trans. of the Ophth. Soc. of the United Kingd.*, vol. ii, p. 265, 1882.

16. PONCET. Tuberculose primitive de l' iris et du corps vitré. *Soc. de Chir.*, séance, 14 Juin, 1882. *Union Med.*, No. 83.

17. RUMSCHEWITSCH (Kiew). Coloboma oculi, membrana pupillaris persistens, polycoria. *C. f. A.*, vol. vi, p. 138.

18. RUMSCHEWITSCH. Case of remnants of the embryonal pupillary membrane. *C. f. A.*, vol. vi, p. 142.

19. SWANZY. Primary tubercle of the iris. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 259.

20. ULLRICH. The anatomical changes in chronic inflammation of the iris. *Gräfe's Arch. f. Ophth.*, vol. xxviii, 2, p. 239.

21. WADE. Coloboma iridis. *Brit. Med. Journ.*, May 13, 1882, p. 703. Demonstration of a case at the Brit. Med. Assoc. at Birmingham.

22. WEINBERG. Kyste de l' iris. *Rec. d' ophth.*, vol. iii, 7, p. 439.

23. WOLFF, B. On tuberculosis of the iris. *C. f. A.*, vol. vi, p. 196.

In a girl of twelve, ARLT (1) saw the iris of the right eye densely covered with grayish, non-vascular nodules, presenting the characteristic appearance of

tubercles and filling the whole anterior chamber. Vision proportionately diminished. Examination of the lungs shows tuberculosis beyond a doubt. Hereditary predisposition.

PONCET (16) made a similar observation in a person of sixteen without any hereditary predisposition and with healthy lungs. No syphilis. Tuberculosis of the iris and anterior portion of the vitreous. The author thinks the latter is not rare, and agrees with Trelat and Perrin in advising the removal of an eye with tuberculosis of the iris, so long as other organs are not affected. An enucleation for tubercles of the choroid should only be performed when there is inflammatory reaction or danger of infection of the surrounding parts.

V. MITTELSTADT.

SWANZY (19) excised the eye of a girl two years old; five months later the child was in good health. Marked tubercular family history. Microscope confirmed diagnosis. S. discusses the case with reference to the inoculation- or infection-theory. FITZGERALD.

In an otherwise healthy girl of twenty, WOLFF (23) observed tubercles confined to the iris of the left eye (granuloma simplex). The microscope confirmed the diagnosis and showed giant-cells.

ULLRICH (20). A series of investigations of portions of iris obtained by iridectomy showed that the essential feature of chronic inflammations of the iris is obliteration of the blood-vessels and fibrous hypertrophy, frequently combined with increased tension. In eleven out of twenty-four cases there was + T; in ten of them the above conditions were found. In secondary glaucoma fibrous hypertrophy of the tissue of the iris was plainly marked, also where anterior synechiæ had existed for some length of time; while in cases where they had existed but a short time, also in parenchymatous keratitis, only hyperæmia and cellular infiltration were noticeable.

WEINBERG (22) examined the left eye of a girl of twelve, the anterior chamber of which was more than half filled by a cyst of the iris. Excision was successfully performed. The walls of the tumor were found to consist of normal iris-tissue.

EALES (6) observed a patient in whom gummous nodules had formed rapidly on both irides, causing absolute glaucoma in one eye; the other was recovering.

MOOREN (12) had an opportunity to examine microscopically a pure gumma of the iris in a young man of nineteen, in whom syphilitic antecedents could not be traced. He found, besides the characteristic structure, great masses of pigment in form of lumps, generally lying together in heaps, but not enclosed in cells.

Among two thousand and sixty-eight cases of iritis, the same author observed one hundred and sixty-nine of pure syphilitic iritis. If, after a regular iridectomy in chronic irido-choroiditis, symptoms of irritation are observed, which, combined with marked distension of the blood-vessels, threaten closure of the pupil, he would diagnosticate syphilis with certainty.

FUCHS (8) describes, in a woman of seventy, a case of melanoma of the iris which had developed without causing any marked symptoms. It consisted of cells only, which had begun to proliferate at the peripheric end of the cross-section

of the sphincter and appeared identical with the pigment-cells found under normal conditions in the iris, while in the melano-sarcomas there are always a few cells with large nuclei only slightly colored or not at all. The cells develop from the stroma-cells of the iris; the pigment-epithelium did not participate; they must, therefore, be distinguished from hyperplasia of the uveal portion.

MOYNE (14). Two cases of traumatic irido-dialysis in two boys twelve years old. The first healed by iridesis, with V — 1; in the other, the lens also was injured, but successfully extracted. Double vision was not found in either patient. DANTONE.

BENSON (2) exhibited at the Pathological Society of Dublin the right eye of a boy æt. ten. Globe enlarged. Cornea clear. Lens subluxated and opaque, with here and there calcareous patches. Iris entirely absent, except a small sector above, which was adherent to lens capsule. Lesions probably due to intra-uterine irido-choroiditis. Iris of left eye normal. FITZGERALD.

CARAFI (4) observed in an anencephalus, besides other formative anomalies, a fissure in the lower lid and iris of the right eye.

MAYERHAUSEN (11). In a case of albinism presenting no unusal features the author endeavors to explain this anomaly as a symptom of a general cachexia (leucopathy).

RUMSCHEWITSCH (17) observed a coloboma of the choroid in both eyes, which reached to the optic nerve, and was complicated with a pupillary membrane. In opposition to Deutschmann the author will only admit the theory of checked growth.

In describing a second case of remnants of the pupillary membrane the author opposes the view of Deutschmann, though the latter did not discuss its origin in his paper, on the development of the coloboma of the choroid as the result of inflammation.

I *b*.—CHOROID AND CILIARY BODY.

1. AYRES, W. Case of sarcoma of the choroid. These ARCHIVES, vol. x, p. 269. *Arch. f. Augenheilk.*, vol. xi, 3, p. 323.

2. BARRAQUER. Un cas de chorioidite tuberculeuse. *Rec. d'ophth.*, Aug., 1882. Clinical history and microscopic examination of the enucleated eye.

3. BRAILEY and LOBO (London). On pathological new-formations in the choroid. *C. f. A.*, vol. vi, p. 262.

4. DANESI. Un caso di sclero-coroidite anteriore con stafilomi terminato assai felicemente. *Boll. d'ocul.*, vol. iv, No. 8, April, 1882.

5. DUJARDIN. Irido-choroidite suppurée chez un enfant de neuf mois. *Journ. des soc. méd. de Lille*, April 5, 1882.

6. GRIFFITH, A. H. (Manchester). Sarcoma of the eyeball. *Brit. Med. Journ.*, April 8, 1882, p. 503. Demonstration of a case which had been communicated from the sclera to the choroid and had detached most of the latter.

7. MAYERHAUSEN. The etiology of hydrophthalmus. *C. f. A.*, vol. vi, p. 225.

8. MELÉ FARRÉ. Syphilitic choroiditis in both eyes. *Boll. del Ateneo de al. intern. del. facult. de med. de Barcelone*, Feb. 1882; *C. f. A.*, vol. vi, p. 183.

9. MOOREN. On disseminate and areolar choroiditis. *Five lustra of ophth. practice.* Wiesbaden : Bergmann, p. 157.

10. PAULSEN. The development of posterior staphyloma of the choroid. *Gräfe's Arch. f. Ophth.*, vol. xxviii, 1, p. 225.

11. REID, THOMAS. Melanotic sarcoma of the choroid. *Brit. Med. Journ.*, April 29, 1882, p. 615.

12. LE ROY. Melanosarcome de la chorioide. *Ann. de la soc. de méd. d'Anvers*, May–June, 1882.

13. STORY. Melanotic sarcoma of the eyeball. *Brit. Med. Journ.*, April 15, 1882.

AYRES (1) observed a melano-sarcoma of traumatic origin. The microscope showed active proliferation of the cells by division, and considerable thickening of the walls of the blood-vessels, the latter probably the result of proliferation of the adventitia and the perivascular tissue of the blood-vessels.

BRAILEY and LOBO (3) found three peculiar conditions in neoplasms of the choroid: 1. A dense layer of connective tissue between the vascular parenchyma of the choroid and the lamina fusca, interspersed with some broad, cystoid cavities filled with blood, which are especially frequent in sympathetic choroiditis. 2. Some peculiar large bodies are described, springing from the inner surface of the choroid, of fibrillar or bony structure, and containing a central cavity filled with a granular, yellowish mass. Besides these there are larger structureless bodies, resembling colloid excrescences. 3. Formation of bone generally takes place on the inner surface of the choroid. The lamina vitrea does not participate ; the bone is formed in the midst of the proliferating pigment-epithelium.

REID (11) exhibited sections of a tumor removed from a woman æt. forty-five. Six years ago she had complained of dimness of vision, due to detachment of the retina in lower half of fundus oculi ; soon afterward vision was quite lost. Two years later she suffered from pain in the eye. Tumor was found occupying lower half of eyeball. Enucleation was performed, and a section showed a pigmented sarcoma springing from choroid and penetrating sclerotic.

FITZGERALD.

LE ROY (12). In this case also the sarcoma seemed to be of traumatic origin. Later a relapse occurred in the orbital tissue, making exenteration of the orbit necessary. MARCKWORT.

STORY (13) describes a melano-sarcoma occupying the ciliary body and the anterior portion of the choroid at the upper and outer quadrant of the left globe. The patient, æt. thirty-three, had suffered from erysipelas over the left temple when three years of age, and had been struck with a twig in the eye six years ago. FITZGERALD.

DANESI (4). Two scleral staphylomas, the size of a grain of wheat, developed in a highly myopic eye, with a peripheric adherent leucoma about 4 *mm.* upward and outward from the corneal margin, producing considerable irritation. Paracentesis proving useless, jaborandi and, later, iodide of potash were successfully employed, the staphylomas disappearing entirely, and leaving M — 5 D and V — $\frac{1}{3}$. DANTONE.

The case of MAYERHAUSEN (7) was one of congenital hpdrophthalmus, whose further development coincided with the beginning of dentition; it gradually attained considerable dimensions, while at intervals inflammatory attacks of an exquisitely glaucomatous character set in, and finally led to nodular deposits on the anterior surface of the corneal epithelium. The size of the globe was reduced and vision improved by the use of eserine, as in an analogous case of Bergmeister (*Wien. med. Presse*, 1881, No. 30).

PAULSEN (10) tries to prove that the cause of posterior staphyloma of the choroid is the constant strain exerted by the optic nerve upon the globe when the latter moves. The lateral portion of the insertion of the sheath in the globe, the point of least resistance, is stretched by the movements of the globe, especially the myopic, producing detachment of the choroidal ring, and atrophy of the choroid, and finally dilatation of the part in question. The author tries to prove by the results of his investigations of seamen, who, while not called upon to accommodate, must see at a distance or upward, that neither accommodation nor convergence, as productive of pressure, nor yielding of the sclera, nor checked growth, exerts any influence upon the position of the choroidal staphyloma. He fonnd staphyloma posticum in sixty per cent., though only 12.5 per cent. were myopic. The dilatation was downward in sixteen per cent., downward and outward in thirty-four per cent.

M. FARRE (8) treated a woman of forty-two, who had been infected by her baby, for syphilitic chorio-retinitis and extensive exudation into the vitreous. Vision, which had been $\frac{1}{\infty}$ was quickly and almost completely restored by inunction.

According to MOOREN (9) disseminate choroiditis is the peripheric, areolar choroiditis the central, localization of one and the same disease. The delicate opacities of the vitreous so frequent in the former cannot be considered characteristic of syphilis. This is only proven by the presence of chronic choroiditis. Secondary glaucoma is rare in this disease. Areolar choroiditis, especially in children, should arouse suspicion of hereditary syphilis.

II.—GLAUCOMA.

1. AGNEW, C. R., and WEBSTER, D. Cases of acute glaucoma. *N. Y. Med. Rec.*, Aug. 5, 1882.

2. ANGELUCCI. Alcune considerazioni sulla etiologia del glaucoma. *Quadri stat. e frammenti d' oftal.*, Roma, 1882.

3. BOUCHE. Du glaucome et de son traitement par la sclerotomie. *Thèse de Paris*, 1882.

4. BRAILEY. Size and position of the crystalline lens in glaucoma. *Roy. Lond. Ophth. Hosp. Rep.*, vol. x, 3, Aug., 1882, p. 372.

5. DRIVER, EUG. The symptomatology and treatment of acute glaucoma. *Inaug. Diss.* Berlin: Lange.

6. DA GAMA, PINTO. Anatomical examination of an eye operated accordng to Critchett's method for corneal staphyloma. *Gräfe's Arch. f. Ophth.*, vol. xxviii, 1, p. 176.

7. KENDALL. Glaucoma following dislocation of lens. *Brit. Med. Jour.*,

Aug. 26, 1882, p. 369. Dislocation of the lens into the anterior chamber, resulting from a blow upon the eye.

8. MAUTHNER. Secondary glaucoma. Second half or Nos. 10 and 11 of his monograph on glaucoma. Wiesbaden: Bergmann, 1882, pp. 117–292.

9. PARINAUD. Du glaucome, sa nature et son traitement. *Gaz. méd. de Paris*, 1882, 9 and 12.

10. PRIESTLEY-SMITH. Glaucoma following a blow on the eye. *Ophth. Rev.*, vol. i, No. 10, 1882, p. 273.

10 *a*. PRIESTLEY-SMITH. Spontaneous dislocation of the lens into the anterior chamber with secondary glaucoma. *Ophth. Rev.*, vol. i, June, 1882, p, 209. The periphery of the iris was driven forward to such an extent by the dislocated lens, that Fontana's canal was closed.

11. SCHNABEL. On glaucomatous affections. *Wien. med. Presse*, 22–26.

12. SIMI. Simptomatologia del glaucoma. *Lezioni di ottalmojatria*, Impartz, April, 1882. Continuation of lectures vi and vii. Symptomatology and pathogeny of glaucoma.

13. SNELL. On eserine and pilocarpine in glaucoma, and eserine in ocular neuralgia.

14. STELLWAG, v. CARION. On glaucoma. Discussions on practical ophthalmology, edited in conjunction with Prof. Wedl and Dr. Hempel. Vienna: Braumüller, 1882,

15. STREATFEILD. Mydriatics and glaucoma. *Brit. Med. Jour.*, July 29, 1882, p. 193.

16. TARTUFERI. Sul glaucoma emorragico e sull' occlusione del canale di Fontana nel glaucoma. *Giorn. d. R. Acad. de Med.* di Torino, Nos. 8, 9, 1882.

AGNEW and WEBSTER (1) report eleven cases of patients between the ages of thirty-five and seventy-five. In fifteen eyes iridectomy was performed, in one eye twice; the result was good in all cases except those complicated with hemorrhagic retinitis; in thirteen useful sight was preserved. BURNETT.

SCHNABEL (11). In twenty-five cases (forty-three eyes) of primary glaucoma the other eye was found healthy in only four; twenty-three of them were cases of glaucoma simplex, in which there was frequently no increase of tension, the excavation only assisting in making a diagnosis, though at times an increased tension was perceptible. The opacities of the cornea also cannot be ascribed to this, but must be considered only as a symptom of glaucoma. Iridectomy arrested the disease, but always diminished sight; forty-five cases of secondary glaucoma were observed. The author supports the theory of hypersecretion in some cases, where occlusion of Fontana's space cannot be thought of. Neither does he consider the choroiditis accompanying glaucoma to be of any influence upon the development of the disease.

As regards the etiology of glaucoma, ANGELUCCI (2) seeks its primary cause in the sclerosis of the arteries, giving rise to stasis in the veins and consecutive exudations into the venous walls. The closure of the perivascular lymph-ducts by the swollen veins is of greater consequence than the closure of Fontana's canal. DANTONE.

The general result of a series of observations made by BRAILEY (4) during the last two years, goes to show that the average size of the lens in glaucoma is below that accompanying other conditions—healthy or morbid. B. considers there is no proof that the lens offers any undue resistance in glaucoma to the passage of fluid through it, and he fails to recognize, in cases of primary glaucoma, any obstruction to the normal outflow of fluid at the anterior surface of the vitreous sufficient to advance the lens. He thinks that if obstruction be a cause, we must look for it in the vitreous itself. FITZGERALD.

MAUTHNER (8) treats of secondary glaucoma in the same masterly manner as of primary glaucoma, although his attempt to overthrow the old theories of glaucoma and establish his own, according to which it is an atrophic degeneration of the parts in question, due to inflammation of the ciliary blood-vessels, gives it a marked polemic character.

PRIESTLEY-SMITH (10) has come to the conclusion that in every case of increased tension, the escape of fluid from the eye is obstructed one way or other. He then reports the case of a woman who received a violent blow on the right eye from the cork of a soda-water bottle; acute glaucomatous symptoms subsequently ensued, and the eyeball was removed. The iris was found to have been drawn forward and its periphery pressed against the cornea by the processes in consequence of the increased size of the senile lens. This close proximity between the processes and the lens he considers the predisposing factor in the initiation of glaucoma. He suggests it as likely that when the processes are greatly swollen and pressed against the iris (and lens), they may unload themselves in a disproportionate amount through their vitreous surface, and the return of the fluid from the vitreous to the aqueous chamber being checked by the compression of the circumlental space, an œdema of the vitreous may be set up. FITZGERALD.

In the chapter on glaucoma, STELLWAG (14) again tries to explain the increased tension by his mechanical theory, the disease occurring only when the sclera is stiff, rigid, and unelastic; while Wedl, basing his opinion on the anatomical examination of glaucomatous eyes, assigns an important influence to the vaso-motor nerves.

DA GAMA, PINTO (6) found that the glaucomatous excavation of the optic nerve was filled with connective tissue consisting of thick bands interspersed with numerous nuclei.

TARTUFERI (16) believes that closure of Fontana's canal precedes sclerosis of the ciliary body. As the latter process advances the meshes of the canal become smaller and smaller, until at last the peripheric portions of the iris and cornea unite. This agglutination cannot be demonstrated in all eyes, and is also observed in non-glaucomatous eyes. The effect of the partial or total closure of the canal upon the glaucomatous process cannot, therefore, be fully decided. DANTONE.

SNELL (13) is satisfied that eserine is of use not only in acute but also in chronic glaucoma. Its action is not so certain in the latter, but still it sometimes not only produces an improvement in the vision but also arrests the progress of the disease. He records a case of acute glaucoma where iridectomy was declined, and not having any eserine at hand, he ordered pilocarpine

"discs." The same evening the patient was much relieved of pain, and a few days later the attack passed off. He has found eserine of great use in cases of ocular neuralgia unattended with increased ocular tension. FITZGERALD.

To avoid the danger attending the use of atropine in eyes with a tendency to glaucoma, STREATFEILD (15) proposes the introduction into the *British Pharmacopœia* of a much weaker solution in addition to the present one. He believes the present scare about the artificial production of glaucoma by use of mydriatics to be much exaggerated, but it ought to be better known that a very weak solution suffices for the production of mydriasis. FITZGERALD.

III.—SYMPATHETIC OPHTHALMIA.

1. AYRES, W. Contributions to the pathology of sympathetic ophthalmia. These ARCHIVES, vol. x, p. 277. *Arch. f. Augenheilk.*, vol. xi, 3, p. 330.

2. CRITCHETT, A. On a case of sympathetic ophthalmia. *Ophth. Hos. Rep.*, vol. x, August, 1882, p. 322.

3. DEUTSCHMANN. Experiments on the pathogeny of sympathetic ophthalmia. *v. Gräfe's Arch. f. Ophth.*, vol. xxvii, 2, p. 291.

4. FROST, W. A. Sympathetic ophthalmia appearing after enucleation of the injured eye. *Trans. Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 21, 1882. *Lancet*, No. 20.

5. GASTALDO, José. Luxation traumatique du cristallin dans le corps vitré, passage de la lentille dans la chambre antérieure, symptomes d' ophthalmie sympathique; extraction partielle; guérison. *Rev. d' ocul. du sud-ouest*, vol. ii, No. 5, p. 106. *La cronica oftalmica.*

6. GONELLA. Contribuzione alla neurotomia ottico-ciliare. *Giorn. del R. Acad. di Med. di Torino*, 8–9, 1882.

7. MILLES. Sympathetic ophthalmia following extraction of cataract. *Ophth. Hosp. Rep.*, vol. x, 3, August, 1882, p. 325.

8. MOOREN. On the transmission of sympathetic affections. *Five lustra of ophthalm. practice.* Wiesbaden: Bergmann, 1882, p. 143.

9. SNELL. Mercury in sympathetic ophthalmia. Praises mercurial treatment. *Brit. Med. Journ.*, May 27, 1882, p. 796.

10. SNELL, S. Sympathetic iritis (?) occurring thirty-two days after enucleation of eye for accident. *Trans. Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 19, 1882.

11. THOMPSON, W. Four cases of traumatic sympathetic ophthalmia. *Med. and Surg. Rep.*, Feb. 11, 1882.

Eleven cases are reported by Mr. MILLES (7), senior house-surgeon, Royal London Ophthalmic Hospital. The patients were five men and six women, the average age being sixty-five. Gräfe's modified linear extraction was performed in each case. In six cases the operation was uncomplicated. In two some soft cortex was left behind. In one the iris was partially torn from its attachment. In one the lens was removed with a scoop, with slight loss of vitreous. Notes lost in one case. Iritis, more or less severe, occurred in six cases. In two there was a slight incarceration of the iris in the corners of

the wound, and in two the iris and capsule were adherent in it. The interval between extraction and the onset of the sympathetic attack was, as a rule, two or three months. Keratitis punctata present in nearly all the cases. T variable.

FITZGERALD.

After accurately describing four cases, THOMPSON (11) classifies the symptoms of sympathetic ophthalmia as follows: (1) Those in the anterior portion of the globe as hyperæsthesia of the region of the ciliary body, especially its upper part, gradual diminution of the breadth of accommodation and premature presbyopia, iritis and its consequences. (2) In the posterior portion hyperæmia of the optic nerve, neuritis, neuro-retinitis, retino-choroiditis, and hyalitis. The author believes in transmission through the optic nerve as well as by reflex action of the ciliary nerves. BURNETT.

CRITCHETT (2). A man received a gunshot wound in the right eye in the ciliary region. Palliative treatment at provincial hospital for a fortnight, then admitted into St. Mary's Hospital under Mr. Anderson Critchett. O S appeared to be perfectly healthy and V normal. O D enucleated. Patient discharged six days afterward with caution regarding use of O S. Fifteen days later, exactly one month after injury, noticed slight indistinctness of vision which gradually increased. Eye became red and painful. About five months later was re-admitted to hospital. Well-marked sympathetic ophthalmia, with $+ T_2$. Iridectomy performed with improvement of V. C. refers to opinion which was held by ophthalmologists up to a recent period, namely, that when an injured globe was removed before any evidence of irritation could be noticed in the other eye, complete freedom from sympathetic ophthalmia might be confidently predicted. This doctrine, as he remarks, has received a rude shock from the recent observations of Mr. Nettleship. The practical inference is, that a short delay may be fraught with danger, and that an emphatic decision should, if possible, be at once arrived at as to the necessity which exists for removal of the injured eye. FITZGERALD.

SNELL (10). Man twenty-six years old. Excision of left eye eight weeks after injury. Globe, which was shrinking, found to contain fragment of steel adherent to ciliary body. Right eye had shown "merely symptoms of irritation," but a week or so after excision patient complained of "a mist." No neuroretinitis, and three weeks after operation pupil dilated by atropine, but two weeks later instillation of eserine was immediately followed by great pain and severe plastic iritis. Complete recovery after treatment by atropine and mercury, patient reading J. 1. FITZGERALD.

FROST (4). Girl of nine, received wound in ciliary region of left eye from a stone. Excision thirty-four days later, globe being soft and somewhat tender and without perception of light. Dimness of right eye first noticed twenty-two days afterward, and when seen eight days later there was keratitis punctata, with pupil active but dilating imperfectly by atropine. No synechiæ, nor conjunctival injection. Fundus normal, $V = \frac{20}{30}$ and J. 1; two months later recovery was perfect. No neuritis could at any time be detected.

(Both of these cases are open to criticism.—REV.)

FITZGERALD.

AYRES (1) found in eight cases, in four of which sympathetic ophthalmia had developed in the other eye, irregularities in the form and appearance of the

fibres of the ciliary nerves, especially as regards the form and number of the nuclei of the interfibrillar connective tissue. The ciliary nerves were frequently found widened to three times their normal extent, and the fibres filled with a row of strongly reflecting globules (myeline) resembling a string of pearls. The author is inclined to assume two methods of transmission of the sympathetic irritation, one through the optic nerve and the other through the ciliary nerves. The former is probable in cases of more rapid transmission, 15-20 days; the latter in cases of slow development. A case of sympathetic neuro-retinitis is reported, eighteen days after the injury of the first eye.

DEUTSCHMANN (3) proved by injections of spores of asperg. glauc. into the optic nerve in nine cases and into the vitreous in three cases, that not only papillitis and inflammation of the injected eye ensued, but also that in eight of these twelve cases there were plain and characteristic indications of transmission to the papilla and surroundings of the optic nerve of the other eye, by way of the optic nerve and its sheaths, the chiasm, and the optic nerve of the other side; besides which there was an infiltration of the anterior portion of the pia mater at the base of the brain. Papillitis and perineuritis generally ensued after seven or eight days, lasted for a few days, and then disappeared without leaving a trace. These experiments are an important step forward in the recognition of the nature of sympathetic ophthalmia, even though it was not possible to fully develop the disease in the second eye.

MOOREN (8) believes that the sympathetic irritation is transmitted through the ciliary nerves and optic nerve, especially through the agency of the vasomotor system. No definite date for the time of its beginning can be given, though the inflammation may set in before the time generally accepted, *i. e.*, the fifth week. In only three cases did Mooren see sympathetic neuritis or neuro-retinitis resp. develop after timely enucleation.

In regard to treatment, GONELLA (6) is opposed to neurotomy. The results of thirteen operations performed by Raymond were very poor. In three cases painfulness continued after the operation; in three it was less, but in two of them it returned after a short time with the former intensity. In seven the painfulness disappeared, though for three of them for only three to nine months; three patients failed to appear again; and in only one no pain was manifested by pressure on the globe after the lapse of a year. The cornea did not become anæsthetic at all, or at least only immediately after the operation. DANTONE.

IV.—REFRACTIVE MEDIA.

a.—LENS.

1. ABADIE. De certaines complications consécutives à l'opération de la cataracte et des moyens d'y remédier. *Ann. d'ocul.*, Sept.–Oct., 1882.

2. ANGELUCCI. Lussatione del cristallino dell' occhio destro; miopia consecutiva; contribuzione al dottrinale dell' accomodazione. *Quadri statist. e frammenti d'oftalm.*, Rome, 1882. Subluxation of the lens and consecutive myopia of 6 D produced by an injury in a young man of twenty-two.

3. ARMAIGNAC. Cataracte capsulo-lenticulaire survenue rapidement chez un jeune homme à la suite d'une irido-choroidite; opération; guérison rapide. *Rec. d'ocul. du sud-ouest*, Feb., 1882.

4. AUSSET. Du traitement de la cataracte molle par la méthode de l'aspiration. *Thèse de Paris.* Nothing new.

5. AYRES, W. C. Gliomatous infiltration of the lens. These ARCHIVES, vol. x, p. 273. *Arch. f. Augenheilk.*, vol. xi, 3, p. 327, with an illustration.

6. AYRES, W. C. On the new-formation of bone in the lens-capsule. These ARCHIVES, vol. x, p. 275. *Arch. f. Augenheilk.*, vol. xi, 3, p. 327.

7. BECKER. The anatomy of the healthy and diseased lens. *C. f. A.*, vol. vi, p, 129.

8. DICKINSON. Congenital cataract. *St. Louis Med. and Surg. Journal*, vol. xliii, 1, p. 53.

9. GAYET. Distribution de la cataracte dans la région Lyonnaise. Assoc. franc. pour l' avancement des sciences. Sess. de 1882 à la Rochelle. *Progr. med.*, Sept., 1882; *Gaz. d'ophth.*, vol. x, 1882.

10. HIRSCHBERG. Anat. and pract. remarks on the extraction of senile cataract, artificial pupil and tattooing of the cornea. *v. Graefe's Archiv f. Ophth.*, vol. xxviii, 1, p. 245.

11. HODGES. Preliminary iridectomy in extraction of cataract. *Brit. Med. Journ.*, Sept. 2, 1882, p. 424.

12. MAZZA. Pietrificazione, degenerazione calcarea, della lente cristallina (calcareous degeneration of the lens). Genoa, 1882.

13. PRIESTLEY-SMITH. Spontaneous dislocation of the lens into the anterior chamber with secondary glaucoma. *Ophth. Rev.*, vol. i, June, 1882, p. 209. Cfr. rep. under glaucoma.

14. PROUET, J. M. Trois observations de cataracte zonulaire. *Rev. d'ocul. du sud-ouest*, No. 8, p. 172.

15. RAMPOLDI. Sublussazione traumatica della lente cristallina—miopia acuta di 4.5 D. Abolizione della camera anteriore. Traumatic subluxation of the lens, M = 4.5 D, loss of anterior chamber. *Osserv. ottalm. Ann. Univers. di Med.*, No. 261, 1882.

16. SCHMEIDLER. Cataract operations at the clinic of v. Arlt from 1874 to 1881. *Wien. med. Wochenschr.*, Nos. 16-18,

17. ULRICH. Rupture of the lens-capsule. *Klin. Monatsbl. f. Augenheilk.*, July, 1882, p. 230.

18. WICHERKIEWICZ. A rare manner of healing of an iridectomy for glaucoma, with some remarks on traumatic opacities of the lens. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 181.

Based on his investigations BECKER (7) makes the following assertions: (1) direct participation plays an important part in the embryological growth of the epithelium of the anterior part of the capsule. The proliferation of the cells takes place in various spots over the whole inner surface of the anterior part of the capsule. The anterior capsule is generally thicker than the posterior. Capsular cataract is the result of proliferation of single cells lying nearer the anterior pole. Outside of the capsular epithelium are found hyaline deposits upon the capsule (Müller's hyaline membrane); membranous congenital cataract is similarly formed. The large swollen cells found in every senile cataract

develop directly from the epithelial cells of the anterior capsule; sometimes the inner surface of the posterior capsule is covered with cells resembling epithelium, from the nuclei of which these swollen cells develop. Chalk is deposited in capsular cataract in the lacunæ of the tissue around the degenerating cells. In soft cataract of young persons there is generally no intracapsular proliferation.

HIRSCHBERG (10) describes his method of treatment in extractions and other operations; the most scrupulous cleanliness is observed, but the strict antiseptic method is not followed. He reports the anatomical examination of four eyes operated for cataract: No. 1, the result of a normal extraction according to Graefe; No. 2, a phthisical globe containing a considerable quantity of cortex with the capsule of the lens healed into the scar; No. 3, an attempted extraction, the whole lens remaining behind; No. 4, total phthisis after extraction. He also gives a microscopical description of a case of tattooed corneal staphyloma combined with an iridectomy. See the original.

ULRICH (17) reports a case of rupture of the capsule of the lens, probably caused by the strain of iritic membranes. The lens was dislocated into the anterior chamber, whence it was extracted. In an old woman, in whom an upward iridectomy had been performed for glaucoma (T — + 3), and in whom an apparently slight dislocation of the lens had taken place, WICHERKIEWICZ (18) found that the nucleus was spontaneously dislocated beneath the bandage under the conjunctiva. The course of healing was normal; according to the author an intracapsular regeneration of the lens-fibres probably took place (?).

In regard to the distribution of cataract in the neighborhood of Lyons, GAYET (9) reports that they occur in about the ratio of 2 : 1000. They are less frequent in women than in men. Senile cataract develops in the latter at forty-four, in the former at forty-nine. Cataract is more common, more than 3 : 1000, where glass-blowing and metallurgy is carried on, a fact which he ascribes to the radiating heat. The number of peasants with cataract is comparatively large.

AYRES (5) found in a glioma of the retina (cfr. *Archiv. f. Augenheilk*, vol. x, p. 325) that the glioma-cells extended on one side of the ciliary body, canalis Petiti, along the whole length of the suspensory ligament to the lens-capsule, had penetrated the latter, and entered the lens itself.

The same writer (6) found in a case of new formation of bone in the lens-capsule, that the cortex had entirely disappeared, and had been replaced by bony tissue. Ossification began in the layers of the lens parallel to the stratum of connective tissue near the capsule. The latter had about its normal convexity.

In November, 1880, ABADIE (1) was so unfortunate as to lose four cataracts in succession by suppuration. He seeks the cause in mycotic infection, emanating from fungi which appeared on the walls and ceiling of the new clinic. In treating beginning suppuration, the author again opens the wound, empties the anterior chamber, and cleanses with boracic acid, and repeats this as necessity demands. Besides this spray of boracic acid every fifteen minutes, every four hours eserine, in very bad cases cauterization of the corneal wound with a glowing platinum wire. MARCKWORT.

For the last six years HODGES (11) always performs preliminary iridectomy before extraction, is very well satisfied with the results, and considers its chief advantages to be the freedom of the anterior chamber from blood after extraction, and the information obtained by the operator as to how the patient bears narcosis.

SCHMEIDLER (16) has prepared the statistics of the cataract operations performed at the clinic of v. Arlt from 1874 to 1881. 1,547 peripheric extractions were performed in 1,460 persons. Good results were obtained in 91.2 %, dubious in 6.44 %, and loss in 2 %. The statistics of the accidents and incidents of the operations and of the course of healing are very interesting.

b.—VITREOUS BODY.

1. ALEXANDER. Left-sided blindness by thrombo-phlebitis, resulting from right-sided suppuration of the vitreous. *Deutsche med. Wochenschr*, No. 34, 1882.

2. DEUTSCHMANN. On genuine tuberculosis of the vitreous in man.

3. DIMMER. The diagnosis of detachment of the vitreous. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 259.

4. LITTLE. Persistent hyaloid artery. *Ophth. Rev.*, July, 1882.

5. MOOREN. On hyalitis. *Five lustra of ophthalmological practice.* Wiesbaden, Bergmann, 1882, p. 192.

6. SWANZY. Detachment of the vitreous humor. *Ophth. Soc. of the Unit. Kingd.*, *The Lancet*, No. 20, 1882.

ALEXANDER (1). A young man of twenty-two, otherwise perfectly healthy, had an adherent leucoma since childhood, probably also a cystoid scar of the right eye. Suddenly acute suppuration, combined with violent pain, began in this eye, though not preceded by any inflammation, and followed in a few hours by dimness of sight of the left eye, which constantly increased, and in four days terminated in complete blindness. Doubtles mycotic infection of the vitreous of the right eye had taken place, producing thrombo-phlebitis in the veins of the optic nerve of the other eye, which was followed by retrobulbar neuritis rapidly terminating in atrophy.

DEUTSCHMANN (2) frequently found pure tuberculosis of the vitreous in rabbits, without any of the choroid and retina after injection of tuberculous matter. The author also found, in a case of amaurosis of a man due to iridochoroiditis, by microscopic examination, that it had been preceded by localized tuberculosis of the vitreous, the other membranes of the eye not being affected.

DIMMER (3) observed two cases of detachment of the vitreous. Once, after an extraction, in which there was a slight loss of vitreous. At first V. was good, but later the semblance of detachment of the retina downward and outward developed. There was, however, no detachment of the retina, as the course of the blood-vessels underneath showed that there must be detachment of the vitreous. The blood-vessels appeared bent at the margin of the detached portion. The cause must probably be sought in shrinkage of the vitreous, followed by serous transudation between the retina and vitreous. The second case was one of irido-cyclitis, which had come to an end leaving numer-

ous posterior synechiæ, in which the same occurrences were observed after repeated iridectomies.

LITTLE (4) saw a rare case in which two blood-vessels wound in spirals about each other, started from the papilla in both eyes, and attached themselves to the posterior pole of the lens, where they formed a closed loop.

MOOREN (5) is inclined to seek the final cause of inflammation of the vitreous in infection. In four cases he saw abscesses of the vitreous after a normal extraction. Division of the membranes in the vitreous scarcely ever produced a good result. The author frequently saw opacities form in the vitreous after inflammation of Tenon's capsule.

V.—RETINA AND FUNCTIONAL DISTURBANCES.

1. ABADIE, CH. Considérations nouvelles sur la rétinite dite albuminurique. *Union méd. de Paris*, Oct. 15, 1882.

2. ABBOT, F. W. The deliverances of the retina. *Buff. Med. and Surg. Journ.*, April, 1882.

3. ADAMÜCK. On detachment of the retina. *Aerztl. Zeitung*, 1882, Nos. 13–15. (Answer to an article of Denissenko.)

4. AGNEW. Glioma of the retina. *N. Y. Med. Jour.*, June, 1882, p. 633.

5. ALVARDO. Case of retinitis pigmentosa, though no pigment could be seen with the opthalmoscope. *Rev. di Cienc. med. Barcel.*, No. 9, 1882.

6. AYRES, S. C. Tobacco amblyopia. *Cincinn. Lancet and Clinic*, Feb. 11, 1882.

7. BENSON. Embolism of the central retinal artery of the retina modified by the presence of a cilio-retinal artery, and

8. BENSON. Extreme tortuosity of retinal vessels, both veins and arteries. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 55, 1882, with plate. Observed in a hypermetropic young man of seventeen with convergent squint and good sight.

9. BERT, P. Observations sur le siège du scotôme scintillant. *Compt. rend. hebd. des séanc. de la soc. de biol.*, No. 29.

10. BORTHEN, LYDER (Throndhjern). Amblyopie centrale nicotique. *Rec. d' ophth.*, vol. iii, No. 4, p. 110, April.

11. BRUNNER. On quinine-amaurosis. *Inaug. Diss.*, Zürich, 1882. Cases.

12. BULLER. Sudden complete blindness after large doses of quinine. *Med. Central-Zeitung*, vol. li, No. 66. These ARCHIVES, *antea*.

13. DERIGS. On retinitis pigmentosa. *Inaug. Diss.*, Bonn, 1882.

14. DOR. Anémie retinienne. Examen ophthalmoscopique d' un cas. *Paris méd.*, 1881, No. 13.

15. EALES (Birmingham). Embolism of central retinal artery. Re-establishment of circulation. Restoration of vision. Permanent central scotoma. *Ophth. Rev.*, vol. i, April, 1882, p. 139.

16. EWETSKY, THEO. (Moscow). Case of syphilitic central retinitis. *C. f. A.*, vol. vi, p. 170, 1882.

17. FUCHS. Arterio-venous aneurism of the retina. *Arch. f. Augenheilk.*, vol. xi, p. 440. These ARCHIVES, this number.

18. GRIFFITH. Glioma of retina. Tubercle of choroid. *Brit. Med. Journ.*, June 17, 1882, p. 911. Demonstration of specimens.

19. HAAB. On cortex-hemianopsia. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 141.

20. HELFREICH. The arterial pulse of the retina. Memorial essay in honor of the three hundredth anniversary of the Jul. Max. University of Würzburg, Leipzig, Vogel.

21. HIGGENS, C. Two cases of disease of the eye simulating glioma. *The Lancet*, No. 21. Nothing new; in one case formation of connective tissue in the retina, then detachment.

22. HORSTMANN. On visual disturbances after loss of blood. *Deutsche med. Wochenschr.*, No. 28, and *Zeitschr. f. klin. Med.*, vol. v, No. 2.

23. KLEIN. Retinitis. Article in *Eulenburg's Real-Encycl. d. med. Heilk.*, vol. ix, p. 451–479.

24. LANG, W. and FITZGERALD. A case of homonymous hemianopsia with paralysis of upward and downward movements of both eyes. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 230, 1882. Rapid recovery, leaving homonymous insular scotomas.

25. MACKENZIE, ST. On a case of acute vascular disease with retinal hemorrhages. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 31, 1882.

26. MARCHAND, B. Contributions to the knowledge of homonymous bilateral hemianopsia and the decussation in the chiasm. *Graefe's Arch. f. Ophth.*, vol. xxviii, 2, p. 63.

27. MICHEL. Report on the occurrence of night-blindness in the workhouse of Rebdorf. *Aerztl. Intelligenzbl.*, Munich, No. 30.

28. MICHEL. On so-called day-blindness. *Sitzungsber. d. phys.-med. Ges. zu Würzburg*, 1882, p. 73.

29. MOOREN. On retinitis punctata albescens, *Five lustra of ophthalmological practice*, p. 216, Wiesbaden, Bergmann, 1882.

30. MOOREN. On retinitis pigmentosa, *l. c.*, p. 219.

31. MULES. Tubercle of the retina. *Trans. of the Ophth. Soc. of the Unit. Kingd. The Lancet*, No. 20.

32. NETTLESHIP, E. Two cases of extreme tortuosity of the retinal veins in otherwise healthy eyes, with plate. *Trans. of the Ophth. Soc. of the Unit. King.*, vol. ii, p. 57, 1882. In one with hypermetr. astigm. and V $= \frac{20}{40}$; the other in a person with normal vision.

33. PARINAUD, H. Des rapports croisés et directs des nerfs obliques avec les hémisphères cérébraux. *Compt. rend hebd. des séanc. de la soc. de biol.*, No. 10.

34. PESSATSKY. Patho-anatomical changes of the retina in some general diseases of the eye. *Inaug. Diss.*, St. Petersburg, 1882.

35. PONCET (Cluny). Du gliome de la rétine. *Arch. d'ophth.*, vol. ii, No. 3, with illustration.

36. ROMORINO. Distacco retinico curato colle iniezioni ipodermiche di pilocarpino. *Boll. d'ocul.*, vol. iv, No. 2, Luglio, 1882. Cure of a case of detachment of the retina, due to hemorrhage, after twenty-two injections of pilocarpine.

37. REICH, M. An interesting and rare case of hemianopsia. *Med. Uebersicht*, April, 1882, p. 123.

38. SAUNDBY and EALES (Birmingham). The changes in the fundus of the eye in anæmia. *Rev.*, Aug., 1882.

39. SCHWEIGGER. On embolism of the central retinal artery. *Arch. f. Augenheilk.*, vol. xi, p. 444. Controversy with Stellwag in regard to misinterpretation of the first case of embolism, observed and diagnosticated by v. Gräfe, of which Schweigger gave the clearest anatomical proof.

40. STREHL. Cases of so-called scintillating scotoma. *Rep. of the Roy. Ophth. Clin. of Munich*, vol. i, pp. 97–126.

41. SWANZY, H. R. Multiple retinal hemorrhages, with detachment of the vitreous humor, causing blindness. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 41, 1882.

42. TWEEDY. Nyctalopia and hemeralopia. *Royal Lond. Ophth. Hosp. Rep.*, vol. x, No. 3, Aug., 1882, p. 413.

43. ULRICH. Embolism of a branch of the central retinal artery. *Klin. Monatsbl. f. Augenheilk.*, July, 1882, p. 238.

44. ULRICH. Three cases of typical retinitis pigmentosa with rudimentary persistent hyaloid artery. *Klin. Monatsbl. f. Augenheilk.*, July, 1882, p. 242.

45. VETSCH. On glioma of the retina. *Arch. f. Augenheilk.*, vol. xi, p. 413. These ARCHIVES, this number.

46. WESTPHAL. On localization of hemianopsia in man. *Charité-Ann.*, 1882.

ABBOT'S (2) theory of the irritation of the retinal fibres by light is based on the assumption that the rays of light, after they have passed through the refractive media, produce molecular motion on the pigment-layer which then strikes the rods and cones, through which it is transmitted. The logical conclusion of course would be that where there is no pigment there cannot be any perception of light, a conclusion which is overthrown by the fact that albinos can have good sight.

HELFREICH (20) made observations on the arterial pulse of the retina in thirty cases. In insufficiency of the aorta (10 cases) he found: 1, the capillary pulse upon the papilla, first observed by Quinke, which manifests itself by the redness during the systole, and the succeeding paleness during diastole; 2, the pulse of the retinal arteries. The former phenomenon is of relatively little importance in comparison to the latter. In the ten cases it was clearly marked in four, only slightly in three, and in three not at all. The same observations were made in three cases of stenosis combined with insufficiency, while in one case of insufficiency of the aorta and mitral valve there was no pulse, and in another plainly visible. There was a venous pulse in only three cases. In pure hypertrophy of the heart pulsation was not observed, also not in stenosis of the aorta. The phenomena are not more clearly marked in aneurism of the

arch of the aorta than in insufficiency alone. No arterial pulse was observed in cases of lead poisoning, in spite of the characteristic pulsatory curve.

As regards inflammation of the retina, ABADIE (1) observed the presence of albumen in the urine long after the discovery of retinitis albuminurica. Perhaps hypertrophy of the heart is the cause both of the interstitial nephritis and the retinal affection, which Abadie would like to call Bright's retinitis.

MARCKWORT.

MACKENZIE (25) reports a case of acute vascular disease with retinal hemorrhages in a man of twenty-eight, who died after less than a week's illness, having had symptoms pointing either to scurvy, idiopathic anæmia, hæmophilia, or purpura hæmorrhagica. M. believes the last most likely. Owing to decomposition necropsy threw no light on the case. FITZGERALD.

SAUNDBY and EALES (38) found marked paleness of the disc and retina in sixty-one cases, fifty of whom suffered from chlorosis and eleven from spontaneous, traumatic hemorrhage respectively. In two cases he observed whitish-yellow flakes in the retina, in four slight neuro-retinitis, while atrophy of the optic nerve was seen but once after childbirth.

SWANZY (41). Man of thirty-five. Sight of left eye had failed rapidly three months before. At examination there was good p.l., and projection was good down and out, but wanting up and in. Exterior of globe, cornea, iris, and lens were normal. Tn. No pain at any time. Grayish opacity behind lens, which proved to be detached and shrunken vitreous. Retina, which was in situ, showed small peripheral hemorrhages. In the other eye, V was nearly normal, but there were also minute peripheral retinal hemorrhages, with floating opacities, and streaks of connective-tissue formation in vitreous.

Patient seemed in perfect health, but pulse-tracings showed increased arterial tension. FITZGERALD.

MOOREN (29) describes a form of disease which he calls retinitis punctata albescens, which he saw but once; the fundus of the eye appears covered with innumerable punctate, whitish spots, resembling crystals of cholesterine, though not so shiny. The papilla was not distinctly visible, and of a grayish color; the retina not transparent; V reduced to $\frac{1}{10}$.

EWETSKY (16) reports a case of unilateral central syphilitic retinitis, in which he found a central scotoma with a normal field of vision. The retina was covered with small whitish dots. Excellent result obtained by inunction.

In ALVARDO'S (5) case retinitis pigmentosa was only probable, as no changes in the pigment were noticeable. In Valencia, Alvardo saw among 5,414 cases of eye-disease, 32 = 0.6 % of hemianopsia, in nine of which = 0.17 %, or 28.1 %, resp. retinitis pigmentosa was found.

MOOREN (30) saw *unilateral* retinitis pigmentosa with hemeralopia only twice in 182 cases. The percentage of Jews considerably exceeds that of Christians; at all events, the pathogeny may be sought in about $\frac{1}{3}$ of all cases in consanguinity. Heredity also plays an important part. Its earliest occurrence was noted in a boy three years old. Congenital hemeralopia may precede the development of retinitis pigmentosa in one generation, while it succeeds it in the next; the one eye of one and the same person may even become affected in the latter order, the other in the former. Mooren considers transmission by heredity of the utmost importance.

In opposition to Denissenko, ADAMÜCK (3) regards shrinkage of the vitreous to be indispensable to detachment of the retina, and that the layer of pigment-epithelium, which offers considerable resistance to the liquid exuding from choroidal blood-vessels, should be perforated. The bulging of the sclera is also favorable to the development of detachment of the retina in myopia. When the volume of the vitreous is diminished, the changes described by Denissenko may in some cases give rise to development and obstinate continuance of detachment. HIRSCHMANN.

BENSON (7) states that since the publication of Mr. Nettleship's remarks on the occurrence of cilio-retinal blood-vessels, he has been on the watch for cases to test the accuracy of two of his "general statements": 1st, That the presence and size of the communicating vessel does not appear to bear any relation to disease; 2d, that no practical significance can at present be attached to this peculiarity in the blood supply of the yellow-spot region. B. argues that if these vessels run the course N. describes, they must, in the event of embolism of the central artery, help to supply that portion of the retina to which they are distributed, and so save it from sharing in the general destruction of the rest. B. has had the good fortune to observe such a case, the result being preservation of good *central* vision. The employment of electricity appears in this case to have been attended with good results. FITZGERALD.

EALES (15) reports a case of a woman, æt. twenty, who in September, 1879, was attacked with sudden blindness in her right eye. On examination about an hour later E. found there was no perception of light, and the ophthalmoscope showed the usual appearances in such cases—the trunk and branches of the retinal artery were much contracted and filled with detached columns of blood. Patient's general health good. No cardiac lesion. Urine contained slight traces of albumen, but no casts. By the following December scarcely any difference between the appearances of the retina and its vessels in both eyes could be noticed. Disc in right eye slightly paler; vision had gradually returned except in small spot in centre of field. E. considers the rapid restoration of circulation against the theory that it was through the collateral branches of anastomosis. He thinks it most likely that the embolus became rapidly broken up in the passing blood-stream, and that the particles were carried into the smaller branches of the artery and became absorbed. The non-recovery of the central vision was probably due to destruction of the delicate extra-vascular structures of the retina at the fovea. FITZGERALD.

In a man of twenty-six, FUCHS (17) discovered an arterio-venous aneurism, downward and inward from the papilla, due to a blow on the eye. The artery, which shows nodular swellings, at once widens, as does also the tortuous vein, and both disappear in a dark disc (spurious aneurism?). Sometimes a process of degeneration sets in in the membrane in form of white stellate spots like those of morb. Brightii, or the retina degenerates in a ribbon-shaped form composed of small white dots. V — eccentric counting of fingers at a distance of ¼ metre.

ULRICH (43). In a man of thirty-two a central scotoma suddenly developed in the right eye, though he could see clearly through an aperture in its centre. The branch of the retinal artery which diverges upward and outward had dwindled away to threadlike thinness, the surrounding part of the retina was of a milky

color; the diagnosis of embolism of that branch of the retinal artery could therefore be diagnosticated with certainty.

AGNEW (4) observed a glioma of the retina, or rather gliomatous degeneration of the whole eye, in a boy of six months, which necessitated enucleation. One and a half years later glioma of the other eye, which also was enucleated. Nine years later no relapse.

PONCET (35) reports a glioma of the retina in a boy of five. Enucleation. Five months later a relapse, necessitating exenteration of the orbit. Cure. The glioma involved one half of the retina, which had become detached and projected from the papilla 1 *cm.* into the vitreous; colloid and fatty degeneration of its elements. The other half of the retina was only slightly detached. The choroid partly atrophic, partly involved in the tumor, which sprang from the pigment-epithelium, and had spread into the deeper layers of the choroid. Lamina cribrosa intact, but gliomatous infiltration beyond it, therefore relapse. A few isolated nests of glioma-cells in the ciliary part of the retina, also in the vitreous. The author lays stress on the absence of cells with divided nuclei or several nuclei, and does not believe that the rapid growth is due to subdivision of the cells. The origin of the tumor must not be sought in any particular layer of the retina. The author assumes a partial return of all these layers belonging to the neuro-epithelium to an embryonic condition, in which no differentiation exists. Propagation took place in this case like in two others of Knapp and de Vincentiis by detachment of glioma-particles, which then proliferated on their new basis. Where there is detachment of the retina the growth of the tumor is slower, the probability of perforation is also less. V. MITTELSTÄDT.

According to VETSCH (45) glioma occurred in the Zürich ophthalmic clinic in 0.03 per cent. of all cases (in Berlin 0.05 per cent.). Report of twenty-four cases, with special regard to their termination. Both sexes are afflicted to the same extent, neither is there any difference in the side. Congenital glioma was observed in three cases, in each unilateral; in the first and second years it occurs twice as often as in the next six years put together. In regard to its cause nothing definite could be determined. A particular new and characteristic symptom, observed in seven cases, or 32 per cent., was megalocornea, which must be referred to increased tension. In nine cases no operation was performed; death ensued in these on an average after sixteen months. Of thirteen who were operated five lived, eight died. In five cases there was a relapse in the orbit, in one with scleral perforation in the parotid after three years, in another after the same length of time in the eye. Two were cured (no relapse after seven and nine years respectively). In recent cases the microscope revealed, besides round-cells, a number of cells with two and more offsets of various length, which Schultze has shown to be normal components of the granular and intergranular layers.

In regard to functional disturbances AYRES (6) reports a case of nicotine-amblyopia in a man of fifty, who smoked and drank but little, but used about two ounces of snuff every day. Rapid decrease of V, in the right to $\frac{20}{100}$, in the left to $\frac{20}{70}$. Rapid improvement after injection of strychnine.

BORTHEN, LYDER (10) frequently failed in detecting a central scotoma in cases of nicotine-amblyopia with colored papers 1 *cm.* square, while it became plainly

apparent when paper only 4 *mm.* square was used. Borthen saw two cases of nicotine-amblyopia in women. MARCKWORT.

In a woman of twenty-eight HORSTMANN (22) observed, four days after abortion with profuse metrorrhagia, visual disturbances and concentric limitation of the field of vision, under the semblance of a slight neuro-retinitis. He could observe its development from the very beginning. It terminated leaving sight slightly impaired, and an insignificant concentric limitation of the field of vision. He then gives a short historical sketch of visual disturbances, after loss of blood, observed up to date. In almost all cases there was a more or less marked opacity of the optic nerve and the retina or atrophic discoloration of the optic nerve. Sight was regained in only the rarest cases; the rule is lasting total amaurosis, or at least a high degree of amblyopia. In a few cases one eye only was affected. He also reports visual disturbances after epistaxis, hemorrhage from the urethral mucous membrane and after blood-letting, besides after bleeding from the digestive and genital organs. Nothing definite is known as yet as to the connection between the cause and effect.

TWEEDY (42) treats of the terms "nyctalopia" and "hemeralopia" according to their etymology and the meaning attached to them by the older and later medical writers.

HAAB (19) reports two cases of cortex-hemianopsia, in which the location of the visual centre in the cortex could be proven at the autopsy by the destruction of an extensive portion of the cortex of the occipital lobe. One case (Huguenin's) was that of a young girl eight years old; poorly developed, scrofulo-tuberculous disposition, complained of periodic headaches, weak memory, vomiting; later, convulsive attacks lasting three to four days, without any disturbances of motility or sensation, only a lack of energy. Reflex action prompt. No ophthalmoscopic changes. A few weeks before she died, right-sided hemianopsia. The autopsy revealed the presence of two tumors, one at the apex of the left frontal lobe, the other at the apex of the right occipital lobe, the brain being about normal in other respects, with the exception of slight thickening of the pia mater at the chiasm. Both tumors are caseous, without any blood-vessels. The author ascribes the visual disturbance only to the second tumor. The other case was one of a woman, sixty-one years old. Left-sided paresis and hemianopsia of both eyes due to endocarditis, with vertical boundary-line in the field of vision. Fundus normal. The autopsy showed: defect at the apex of the right occipital lobe, cystoid softening of the entire surroundings of the sulcus hippocampi, confined especially to the cortex and due to embolism. Nothing else abnormal.

MARCHAND (26) reports three cases of homonymous bilateral hemianopsia, together with the autopsy: (1) Left-sided hemianopsia in the upper quadrant in a young man of twenty-three, without any cerebral disturbances. Tumor in the gyrus hippocampi of the right side, extending to the temporal lobe and right optic tractus, though only the surface of the tractus appears softened. The tumor is 7 *cm.* long, 3 high, 2.5 thick, and of a gliomatous structure. The optic nerves seem normal. The lower lateral fibres of the optic nerve had been destroyed. (2) Similar case of softening of the left tractus and right-sided bilateral hemianopsia in a woman thirty years old. The autopsy revealed

thrombosis of left internal carotid and a wedge-shaped infarct emanating from it, which extended into the left optic tractus. Soft degeneration of one third to one half of the tractus. The insula likewise had softened. (3) Softening the size of a hazel-nut at the apex of the right occipital lobe in a person seventy-two years old, with left-sided total hemianopsia. On the lower surface of the anterior lobe a white, firm body the size of a cherry-stone (dead cysticercus) was embedded. A short critical review of the literature in question follows; he accepts twenty-two cases as genuine.

The author also reports the micro-anatomical condition of the optic tractus in an atrophic optic nerve, where he found in the chiasm the upper, then the middle, atrophic fibres uncrossed, another portion crossed; the latter appear on the lower surface nearer the median line.

REICH (37) describes a case of right-sided hemianopsia with good central vision ($\frac{10}{10}$ in each eye), vertical dividing line, no ophthalmoscopic changes in the optic nerve for three and a half years; syphilis probable only from anamnesis; later, dementia not observed by the author; paralytic symptoms; death; one and a half months previously total amaurosis. The autopsy showed a softening and atrophy in the left occipital lobe. Softening in the corpus striatum; the optic thalami flattened. The author calls attention to the fact that destruction of the central organ had been going on for several years without producing secondary atrophy of the optic nerve. HIRSCHMANN.

WESTPHAL (46). A man of thirty-eight suffered from loss of consciousness, aphasia, chronic twitchings in the facial nerve and the right arm; later, paresis of these parts and hemianopsia without any ophthalmoscopic changes. The autopsy showed: posterior left central gyrus thinned, firm adhesion of the pia mater to the brain, due to chronic inflammation in the cortex of left occipital lobe. He assumes that this caused the hemianopsia. The case is of especial interest, as degeneration was confined to the cortex.

VI.—OPTIC NERVE.

1. BERGER (Graz). On formations of connective tissue in the optic nerve, the papilla, and the retina. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 269.

2. BRAILEY, W. A. Disease of the optic nerve in a case of retinal detachment. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 91, 1882.

3. EDMUNDS, WALTER. Contributions to the pathology of double optic neuritis. *St. Thomas' Hosp. Rep.*, vol. xi, 1882.

4. FUCHS. Contribution to the congenital anomalies of the optic nerve. With an illustration. *v. Graefe's Arch. f. Ophth.*, vol. xxviii, 1, p. 139.

5. GRIFFITH, A. H. (Manchester). Horizontal hemiopia with atrophy of half of optic papilla. *Ophth. Rev.*, vol. i, March, 1882, p. 153.

6. HIGGENS. Trois cas d' atrophie simple des nerfs optiques observés sur les enfants d' une même famille. *Rec. d' ocul. du sud-ouest.*, vol. iii, p. 154.

7. HILBERT (Königsberg). A peculiar anomaly of pigmentation of the fundus. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 276.

8. HUE. Essai sur les tumeurs du nerf optique. *Thèse de Paris*, p. 162, May, 1882.

9. HULKE. Spurious neuroma of the optic nerve. *Roy. Lond. Ophth. Hosp. Rep.*, vol. x, 3, Aug., 1882, p. 294.

10. LAWSON. Sarcoma springing from the sheath of the optic nerve. *Roy. Lond. Ophth. Hosp. Rep.*, vol. x, 3, Aug., 1882, p. 296.

11. MACKENZIE, S. Double neuro-retinitis, total loss of vision. *Brit. Med. Jour.*, April 29, 1882. p. 617.

12. MOOREN. On neuritis optica. *Five lustra of ophthalmological practice.* Wiesbaden, Bergmann, 1882, p. 234.

13. NETTLESHIP. Case of injury to the optic nerve. *St. Thomas' Hosp. Rep.*, vol. xi, 1882.

14. PANNARD. Elongation des deux nerfs optiques pour une atrophie de ces nerfs d' origine syphilitique. *Soc. de chir.*, Séance de 12 Avril. *Gaz. méd. de Paris*, No. 16.

15. RAMPOLDI. Ambliopia progressiva da bilaterale atrofia dei nervi ottici. Morte repentina prodotta da Rottura di un aneurisma della branche terminali della carotide interna. *Ossero ottal. Ann. Univ. di Med.*, v, 261, 1882.

16. RUMSCHEWITSCH (Kiew). Unilateral pigmented atrophic optic disc. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, p. 279.

17. SAMELSOHN (Cologne). The anatomy and nosology of retro-bulbar neuritis (amblyopia centralis). *v. Graefe's Arch. f. Ophth.*, vol. xxviii, 1, p. 1–110.

BERGER (1) reports three cases of unilateral formation of strands of connective tissue of silvery sheen and fine longitudinal striation. They lay very near the surface of the retina and papilla. V normal, also the blood-vessels. He considers them to be remnants of a former neuro-retinitis, which, perhaps, developed in early youth or in intra-uterine life. No congenital syphilis.

BRAILEY (2). Man of fifty. Retinal detachment at and just below the macula. Refraction was highly myopic, and vitreous contained numerous floating opacities. Excision for supposed choroidal sarcoma. This supposition proved incorrect, but there was found in optic nerve a new growth of peculiar character. The nerve was much thickened, owing to a new-formation of fibrous tissue, arranged in longitudinal bands, made up of extremely fine, wavy filaments. Many of these fibrous zones contained large cavities resembling those which, in myxomatous tumors of optic nerve, contain the mucous tissue. The iris and optic disc gave evidence of a former glaucomatous condition.

FITZGERALD.

EDMUNDS (3) reports a very important case, showing the extreme rapidity with which optic neuritis and meningitis may sometimes follow fracture of the skull. F., æt. eight, died twenty-four hours after rupture of liver and kidney, with fracture in middle fossa of base of skull. The fracture did not pass into the orbits, nor near the optic nerves. Post-mortem examination showed "some meningitis at the base of the brain," the optic nerves of a reddish color, and some pyriform swelling of the nerve behind the eye. Microscopical examination showed increase of nuclei of the outer sheath of the optic nerve, the inter-vaginal space stuffed with densely packed cells, the inner (pial) sheath less inflamed; commencing inflammation along the intrinsic blood-vessels and trabeculæ of the

nerve more marked at periphery than centre of nerve. Commencing œdema with inflammation of capillaries in papilla. General distension of blood-vessels, with excess of leucocytes. No decided distension of sheath of nerve. An excellent lithographic plate showing the microscopical changes. NETTLESHIP.

MACKENZIE (London) (11) reports the case of a patient, æt. twenty-four, who had, in September, 1878, after pursuing a rabbit, fallen down and remained unconscious for about thirty-six hours. By-standers stated that he had kicked and struggled violently, and that he had had twenty fits. He suffered severely for some time from headaches, especially on exertion, but was able to resume work in ten weeks. He still suffered at times from headaches. In spring of following year had another "fit," and was unconscious for four or five hours. About three months had another "fit," much slighter; and since then has had "fits" at more frequent intervals, every four, five, or six weeks. In November, 1881, found he could not see with right eye, and had some darting pain in the head, chiefly toward the back. Sight of left eye then became impaired, and he had to give up work about Christmas, and the following January he had quite lost the sight of the right eye, and the left rapidly became worse, until about three weeks before his admission to the London Hospital, when he had lost all perception of light. No history of syphilis. Had given up all alcoholic drinks a year before first "fit." Generally vomited when he had the "fits," or sometimes independently of them. No strabismus. Pupils equal and dilated. Ophthalmoscope showed margins of discs blurred and indistinct. Surfaces slightly striated; exudation present to a large extent; arteries very small; veins dark and prominent. Treatment: iodide of potassium and mercurial inunction. M. considered that the symptoms, taken with the changes in the discs, rendered the existence of a tumor not improbable, but there was no direct evidence of its presence. The total loss of vision was unusual in neuro-retinitis, but he attributed it to the great amount of exudation present, due to the late stage of the disease. *British Medical Journal*, April 29, 1882, p. 617. FITZGERALD.

MOOREN (12) believes that there is only a difference in degree between optic neuritis and neuro-retinitis, as the causes of inflammation are the same in both; neither is there any anatomical or clinical difference between them. The recurrent forms of retinitis in brain syphilis may be regarded as due to stasis within the blood-vessels, caused by the proliferation of connective tissue. The optic nerve then has a swollen, mouldy appearance. The increased sensibility of the patients for light is a characteristic symptom. After syphilis has seemingly been cured, a slight injury to the head may give rise to a syphilitic neoplasm. Commotio cerebri or of the medulla may also produce optic neuritis, though the florid stage of neuritis has never been observed after injuries of the spinal cord, only their consequences in form of anæsthesia or atrophy of the optic nerve respectively. The explanation lies in the vaso-motor disturbance produced by the injury. Optic anæsthesia was also observed in the initial stage of scarlet fever and measles; perhaps they can also give rise to optic neuritis. Of typhoid fever this is certainly true. Heredity plays an important part, which may be explained by endarteritis of the central retinal artery. Interesting details in the original. The dependence of neuritis on diseases of the skin in consequence of vaso-motor reflex action cannot be denied, as well as the connection between affections of the optic nerve and uterine diseases.

SAMELSOHN (17). Detailed report of the case briefly described previously, and of especial importance as being the first anatomical examination of a case of retrobulbar neuritis. It was found to be a partial interstitial neuritis with marked tendency to cicatricial contraction and secondary descending atrophy of the optic nerve-fibres. Among the causes are colds and abuse, especially of tobacco and alcohol. He found these in thirteen per cent., after adding the cases of toxic amblyopia, in thirty-seven per cent. of all diseases of the optic nerve. He considers the central scotoma a characteristic symptom, and as it can be due to only those fibres of the optic nerve, which supply the region of the yellow spot, information could be obtained as to their position in the optic nerve. It was found that the partial grayish discoloration at the most distant part from the globe was exactly in the centre, was surrounded by a margin of normal nerve-fibres of uniform width, and occupied about one half of the whole surface. The degenerated nerve-fibres were then found on the temporal side of the optic nerve, and then, changing from a cylindric to a triangular shape, they entered the papilla and radiated into the retina. The scotoma may be either positive or negative. Absolute scotomas are rare, generally they are relative. In these the diminution of color-perception is especially marked. The colors are changed either in their shade or in their tone. The reduction of the sense of space and of the power of vision is not proportional to the severity of the case. Improvement takes place from the periphery toward the centre. Samelsohn obtained excellent results by giving large doses of iodide of potassium.

GRIFFITH (5) reports the case of a man, æt. forty-two, with horizontal hemiopia and atrophy of half of the papilla. Field of vision, left eye, taken at twelve inches from blackboard, entirely wanting below a horizontal wavy line, which lay from three to six inches below the point of fixation. Supposed to be due to embolism of one or more of the arterial twigs supplying optic nerve.

FITZGERALD.

RAMPOLDI (15) reports a case of bilateral amblyopia due to atrophy of the optic nerve; papilla whitish and slightly sunken, blood-vessels normal, and no trace of a former neuritis visible with the ophthalmoscope. The patient died while under treatment, when an aneurism of the left internal carotid the size of a nut was discovered, which pressed upon the optic nerve and chiasm. The ophthalmic artery was not affected. DANTONE.

FUCHS (4) endeavors to prove that the choroidal conus at the lower edge of the disc is found comparatively often, though frequently very narrow; that it is the result of congenital checked growth, and must therefore be strictly kept apart from the staphyloma at the temporal edge. An error of refraction is frequently connected with it, generally myopia, also imperfect vision, so that it is of importance in congenital amblyopia. He then gives the statistics of forty-five cases observed by him.

HILBERT (7) observed a slate-colored pigmentation of both discs of a patient, the centre of the physiological excavation being intensely black; on both the inner and the outer half of the disc there are two black pigment spots. The whole optic nerve is surrounded by a circular intensely black staphyloma posticum.

RUMSCHEWITSCH (16) also observed a pigmented disc in a boy eleven years

old, who had previously received a severe blow upon the eye, which probably produced atrophy of the optic nerve. The edge of the disc was covered with lumps of pigment of various sizes.

HUE (8) reports a case of sarcoma of the optic nerve in a child seven years old, who died of meningitis nine days later.

HULKE (9) reports the following case: A girl, æt. nineteen, with extensive proptosis of right eyeball. So excessive that with strong effort the eyelids could not be closed, and occasionally in making the attempt the lids slipped behind the globe. The eye began to protrude at the age of six, and had continued to do so very slowly. No pain, but gradual loss of sight. Eye moved consensually with the other. No ophthalmoscopic changes. H. supposed the presence of an exostosis. Made exploratory incision in the conjunctiva, through which, with the finger, he could feel a tumor at the bottom of the orbit, so intimately connected with the optic nerve that it could not be separated from it. Globe removed with tumor. Latter proved to be a sarcoma taking its rise in the loose tissue of the intervaginal space. FITZGERALD.

LAWSON (10) reports a case, an apparently rapidly growing sarcoma, springing from the sheath of the optic nerve. The patient soon recovered after the removal of the globe and tumor, but the latter shortly recurred, and grew with great rapidity. At the post-mortem, numerous secondary growths were found in different regions of the body. FITZGERALD.

NETTTLESHIP (13) reports cases of injury of the optic nerve, the chief interest of which consists in the record of ophthalmoscopic signs of atrophy of the disc comparatively early after the injury in several of the cases, viz.: one week in case 1 (observed by W. H. Power), two weeks in case 3, one month in case 5. The earliest signs of atrophy probably show the time occupied in the descent of simple atrophy from the optic canal to the eye, a distance of about one inch (25 *mm.*). NETTLESHIP.

VII.—INJURIES AND FOREIGN BODIES.

1. BENSON, A. Traumatic suppurative cyclitis and hyalitis. *Brit. Med. Journ.*, May 6, 1882, p. 664. Demonstration of a case.

2. BENSON, A. Injury to the eye causing amaurosis. *Brit. Med. Journ.*, April 29, 1882, p. 621.

3. DUFOUR. Corps étranger dans le cristallin. *Rev. med. de la Suisse Rom.*, Jan., 1882.

4. GRAEFE, A. Epicritical remarks on operating for cysticercus. *v. Graefe's Arch. f. Ophth.*, vol. xxviii, 1, p. 187.

5. GRIFFITH. Removal of a chip of iron from lens by electro-magnet. *Oph. Rev.*, vol. i, No. 9, 1882, p. 243.

6. GRIFFITH. Removal of a chip of iron from the iris. *Ophth. Rev.*, vol. i, No. 9, 1882, p. 244.

7. HAASE. Case of cysticercus cellulosæ in the vitreous. *Arch. f. Augenheilk.*, vol. xi, 4, p. 396. These ARCHIVES, this number.

8. HÄNEL. Rupture of the globe. Perforating wound of the sclera. *Jahresber. d. Ges. f. Nat. u. Heilk.*, Dresden, 1881–82, p. 30.

9. LANDMANN. The action of aseptic foreign bodies which have entered the eye. *v. Graefe's Arch. f. Ophth.*, xxviii, 2, p. 152.

10. LEBER, TH. Remarks on the action of metallic foreign bodies in the eye. *v. Graefe's Arch. f. Ophth.*, vol. xxviii, 2, p. 237.

11. LANDESBERG (Philadelphia). (1) Chip of iron ten years within the vitreous. Two cases cured by paracentesis. (2) Piece of gun-cap in the iris for seven years extracted by iridectomy. (3) Chip of iron in the iris for three years removed by iridectomy. Relatively good results obtained in all cases. *Klin. Monatsbl. f. Augenheilk.*, vol. xx, pp. 320, 323, and 324.

12. LANDESBERG. On the behavior of foreign bodies in the interior of the eye. *C. f. A.*, vol. vi, p. 257. (1) Piece of steel in the fundus for eleven years with preservation of good vision. (2) Chip of steel in the fundus for five years with preservation of normal vision. Elimination of a chip of brass from the interior of the eye by suppuration with preservation of $V = \frac{1}{2}$.

13. LITTLE (Manchester). On foreign bodies in the eye. Three cases. Two were extracted with the magnet; one with the forceps after remaining in the iris sixteen years. *Ophth. Rev.*, July, 1882.

14. NOYES, H. D. A case of lodgment of a foreign body in the cavities of the nose, orbit, and cranium. *Amer. Med. Soc.*, July, 1882.

15. REYMOND. Case of cysticercus in the retina. *Giorn. d. R. Acad. di Med. di Torino*, 8–9 Seduta, 14 Luglio, 1882.

16. RITZEL, JEAN. Blessure de la cornée, de l' iris, et du cristallin par un fragment de capsule. Extraction du corps étranger et guérison complète. *Rev. d' ocul du sud-ouest*, vol. iii, 6, p. 130.

17. VILLALONGA. Staphyloma of the iris due to an injury. *La rev. di cienc. med., Barcel.*, Apr., 1882. *C. f. A.*, vol. vi, p. 311. Abscission with good result.

18. WOOD-WHITE. Foreign body in the eye. *Brit. Med. Journ.*, Apr. 8, 1882, p. 502. A chip of iron $\frac{1}{4}''$ long, which had been embedded in the lens-capsule for eleven years, was extracted with good results.

BENSON (2) showed at the Pathological Society of Dublin a boy who some time previously had been struck under the right eye by a blunt rod of steel. There was no external hemorrhage. The eye was rather prominent, and its motions were restricted. Ophthalmoscopic appearances normal, but sight was quite lost. Lesion probably due to pressure far back of effused blood on optic nerve. FITZGERALD.

GRIFFITH (5). A piece of metal was lodged in the deepest layers of the lens for seven weeks before patient's admission to the Manchester Eye Hospital, under Dr. Little. Electro-magnet applied without needle to surface of cornea, when the piece of metal flew out and fell into the anterior chamber, from which it was removed through an incision made with a broad needle and the lens substance extracted by suction. FITZGERALD.

GRIFFITH (6). Patient, æt. forty, came with slight attack of iritis. Stated that he had been struck on the eye sixteen years before by a chip of metal, and since then had had frequent attacks of pain in the eye. On outer and lower quadrant of the iris, midway between the attachment of the latter and

the edge of the pupil, there was a raised brown nodule, the size of a pin's head. No scar could be found on the cornea. An incision was made with a broad needle at the outer edge of the cornea, the aqueous was allowed to flow off slowly, and the foreign body removed with fine iris forceps. FITZGERALD.

LANDMANN (9) first reviews, historically and critically, the literature of foreign bodies which have penetrated aseptically into the eye, and their consequences. He bases his conclusions on the fact established by Leber, that inflammation is produced only by an infected foreign body, and reports some new observations from the Göttingen clinic. He classifies the literature in operation under the following heads: (1) The action of chemically indifferent foreign bodies in the anterior part of the eye; (2) of foreign bodies in the vitreous and the surrounding membranes; (3) of not indifferent foreign bodies, especially in view of the effect produced upon vision by oxydation in the course of years. Detachment of the retina, so frequently the result, is explained by the changes brought about by the foreign body in the vitreous, as it exerts a pull inward. This again gives rise to perforation of the retina and subsequent escape of the vitreous into the subretinal space. He then draws practical conclusions, and approves the generally adopted practice of waiting, unless more serious inflammation sets in.

LEBER (10) adds a note to this, in which he reports the results of his experiments on the action of metallic foreign bodies within the eye; when introduced aseptically, they produce inflammation only when in contact with the iris, not in the vitreous. Detachment of the retina, as above stated, is due to changes in the vitreous. Lead may be considered an indifferent foreign body, while mercury produces severe purulent inflammation, which, however, is not transmitted to other parts of the eye.

NOYES (14) observed the case of a man who had been injured by the explosion of a gun; the right eye was closed, the globe atrophic and united with the inner wall of the orbit, and a large foreign body visible in the posterior part of the nose. When extracted it was found to be a piece of the barrel of the gun, 12 *mm.* wide and 11 *cm.* long, and weighing 84 grms., which had penetrated into the brain. The patient died soon afterward from purulent inflammation of the brain. BURNETT.

HAASE (7) discovered a cysticercus in the right eye of a young man of twenty-one, upward and inward from the papilla, which entered the vitreous in the course of a few days. The parasite, which measured 17 *mm.* in length, escaped spontaneously through a meridional incision of the sclera, according to Graefe, 8–10 *mm.* long, with only slight loss of vitreous. No reaction. Vision was reduced to recognizing the motion of the hand at 2–3 ft. The author observed five cases of cysticercus among thirty thousand patients in Hamburg, two of which, being subconjunctival, were easily extracted, while an operation was refused in a subretinal one, and another in the vitreous. Three years later, the latter had not yet destroyed the eye.

REYMOND (15) successfully extracted a cysticercus of the retina (as far as known to the reporter, this is the second case observed in Italy). DANTONE.

GRÄFE (4) reports the results of twenty-four cases of extraction of cysticercus according to his method, in sixteen of which, by the smooth removal of the

parasite, a perfect result was obtained, as far as vision and other conditions were concerned. In eight cases in which the operation failed, the cysticercus lay either perfectly bare in the vitreous, with great freedom of motion, or it was surrounded by a number of membranous envelopes. He describes in detail the position and location of the parasites, the subretinal and those situated in the vitreous, the fixed and the movable. The last-mentioned are least suited for an operation. The subretinal ones are also difficult of removal, and the determination of their exact location previous to the operation is of the greatest importance. Gräfe constructed a localizing ophthalmoscope for this purpose, for the description of which *v.* the article itself.

VIII.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

1. ABERCROMBIE, G. A case of uniocular diplopia. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 210, 1882.

2. ADAMS, J. E. Two cases of embolism leading to suppurating panophthalmitis in both eyes. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 27, 1882.

3. BEHRING and WICHERKIEWICZ. Case of metastatic chlorosarcoma. *Berl. klin. Wochenschr.*, No. 33, 1882.

4. BOLIS. La tabe dorsale e le sue successioni morbose oculari. *Raccoglitore med.*, Nos. 2, 5, 6, 1882.

5. CARRERAS, ARRAGÓ. The measles and their various primary and secondary manifestations on the eye. *La rev. di cienc. med.*, Nos. 12, 14, June-July, 1882. *C. f. A.*, vol. vi, p. 309.

6. CORNILLON, F. De l'héméralopie dans les affections du foie. *Le prog. méd.*, No. 23.

7. CORNWELL, H. G. Purulent cyclitis in phlegmonous erysipelas. *N. Y. Med. Rec.*, Aug. 15, 1882.

8. COUPLAND, S. Case of neuro-retinitis following contusion of the brain, with meningitis; death five months after the injury. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 73, 1882.

9. CRITCHETT, G. ANDERSON. Neuro-retinitis of right eye in secondary syphilis. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 59, 1882.

10. DOWSE, T. S. On some points in the differential diagnosis of intracranial disease, general paralysis of the insane, and tabes dorsalis. *Brit. Med. Journ.*, May 27, 1882, p. 769.

11. DREWES. Contribution to the statistics and diagnosis of the syphilitic affections of the eye. *Inaug. Diss.*, Berlin, Dräger.

12. EDMUNDS, WALTER. Case of suppurative panophthalmitis following ligature of common carotid. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 25, 1882.

13. FERÉ. Ocular megrim in the initial stage of general paralysis. *Prog. méd.*, No. 31, Aug. 5, 1882.

14. FRASER and GAIRDNER. The ophthalmoscope in cases of aphasia. *Brit. Med. Journ.*, May 27, 1882, p. 769.

15. GOWERS, E. R. Sequel to a case of cerebral tumor. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol ii, p. 84, 1882.

16. HÖSCH, JUL. On diseases of the walls of the retinal blood-vessels, especially after facial erysipelas. *Inaug. Diss.*, Berlin, Dräger.

17. HUGHLINGS-JACKSON. Observations on migraine. *Brit. Med. Journ.*, p. 464, April 1, 1882.

18. HUGUENIN (Zürich). Cases of meningitis. *Corresp. f. Schweiz. Aerzte*, 1882, Nos. 4 and 5.

19. LAWSON. Tumor of the brain. Optic neuritis. *Roy. Lond. Ophth. Hosp. Rep.*, vol. x, p. 311, Aug. 3, 1882.

20. MACKENZIE, S. Microscopical specimens showing neuro-retinitis with large hemorrhagic extravasations into the retina, from a case of idiopathic (progressive pernicious) anæmia. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 40, 1882. The case has been previously described in vol. i, p. 51, of the Trans.

21. MACKUNA. Variolous affections of the eye, their pathology and treatment. *Brit. Med. Journ.*, p. 811, March, 1882.

22. MATHIEU, A. Tumeur du pédoncule cérebral. *Prog. méd.*, No. 10.

23. MILLS, C. K. Notes on twelve cases of brain-tumor. *Amer. Arch. of Med.*, Rep. Aug., 1882.

24. MOORE. Pyæmic panopthalmitis resulting from embolism in mitral stenosis. *Dublin Journ.*, Sept., 1882.

25. MULES, P. H. A case of general retinal periarteritis resulting in chronic renal disease, with remarks. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 47, 1882.

26. NETTLESHIP, E. Atrophy of optic disc after phlegmonous erysipelas of orbit. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 90, 1882.

27. NETTLESHIP, E. Retinitis with white patches in both eyes of a man suffering from diabetes. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 51, 1882.

28. NIEDEN, A. Case of recurrent herpes zoster ophthalmicus. *C. f. A.*, vol. vi, p. 161.

29. OGLESBY, R. P. Typhoid fever in relation to disease of the optic disc. *Brain*, July, 1882, p. 197.

30. PETRUCCO. Dei fenomini oculari in relazione ai fenomini generali nell' alcolismo e nicotismo cronici. *Gazz. med. ital. Prov. venet.*, Nos. 24 and 25, Giugno, 1882.

31. PIERRE, MARIE. Note sur l'état de la papille chez les épileptiques au-dehors des attaques. *Arch. de neurol.*, No. 10, p. 42, July, 1882.

32. PONCET (Cluny). De l'état du nerf optique et de la rétine chez un ataxique. *Soc. de biol.* Séance de 18 Fev., 1882, *Prog. méd.*, No. 8.

33. POWELL, DOUGLAS. Clinical remarks on a case of ptosis with pulmonary disease of tubercular (?) origin. *Lancet*, May 6, 1882.

34. RAMBOUD. Contribution clinique à l'étude de la déviation conjuguée des yeux et de la tête dans certains cas d' hémiplégie. *Thèse de Bordeaux*, 1882.

35. RAMPOLDI. Rapporti morbosi esistenti tra l'apparecchio orinario e il visivo. (On the pathological connection between the diseases of the urinary apparatus and the eye.) *Ann. univers. di med., Fasc.* March, 1882.

36. RAMPOLDI. Un caso di gozzo esoftalmico. (Graves' disease). *Osserv. ottalm. Ann. univ. di Med.*, No. 261, 1882.

37. RAMPOLDI. Ischialgia destra acuta; glaucoma acuto intorto alcune ore dopo nell'occhio destro. Guarizione mediante iridectomia. Glauc. consumato nell'occhio sinistro. *Osserv. ottalm. Ann. univ. di Med.*, No. 261, 1882. Acute glaucoma combined with sciatia, after the patient had been standing a long time in the water with bare feet. The author cannot find any satisfactory explanation.

38. SAUNDBY and EALES. Changes in the fundus oculi in anæmia. *Ophth. Rev.*, vol. i, 2, p. 303.

39. SAUNDBY. Migraine, with paralysis of third nerve. *Lancet*, Sept. 2, 1882.

40. SHAW, JOS. Melancholia, with left hemiplegia and defective vision of left eye. Destructive lesions of right ascending convolutions, and gyrus angularis. *Brain*, July, 1882, p. 257. The ocular symptoms could be but imperfectly observed, owing to the mental state.

41. STENGER. The cerebral disturbances of paralytics. *Arch. f. Psych.*, vol. xii, 1.

42. STRÜMPELL. Case of cerebral tumor, with central unilateral deafness and choked disc of both eyes. *Neurol. Centralbl.*, 1882.

43. SZILI, AD. (Buda-Pesth). Temporary blindness in childbed. *C. f. A.*, vol. vi, p. 169.

44. ULRICH. Five cases of poisoning with meat in one family. *Klin. Monatsbl. f. Augenheilk*, July, 1882, p. 235.

45. WAREN-TAY. Two cases of optic neuritis, without impairment of vision after injury to the head. *Trans. of the Ophth. Soc. of the Unit. Kingd.*, vol. ii, p. 66, 1882.

In regard to ocular affections after meningitis, HUGUENIN (18) describes four different conditions of the retina and disc, after acute as well as chronic basilar meningitis, which frequently, however, merge into each other, but sometimes develop alone: 1, retinal stasis; 2, œdema of the papilla; 3, neuro-retinitis; 4, atrophy. Detailed description of the individual symptoms.

ABERCROMBIE (1). Girl of eleven. Headache, vomiting, slight double optic neuritis, impairment of speech, and paralysis of right ext. rectus, with converg. strabismus; diplopia with both eyes, and also when right alone was used. Death. A large abscess was found in region of right temporo-sphenoidal and occipital lobes. (It will be noticed that this, and also Dr Ord's two cases, had binocular diplopia from strabismus.)

COUPLAND (8). Boy of five. Fell on his head, and subsequently presented various cerebral symptoms, which are recorded at great length. Necropsy: No fracture of skull, but remains of subarachnoid hemorrhage, and several old hemorrhagic foci in substance of brain, with meningitis.

Reference to parallel case (Leber and Deutschmann, A. f. O., Band 27, Abth. 1, p. 302, 1881) in which patient recovered with optic atrophy.

FITZGERALD.

GOWERS (15). Sequel to a case of cerebral tumor:

The case was one of intracranial disease, with optic neuritis and paralysis of the upward movements of both eyes. (Trans. vol. i, p. 117, 1881.) Patient is better, and upward movements have increased. Discs very pale, but reads No. 2 test-type. Field of one eye normal for white and colors; that of the other is very irregularly restricted, especially for colors, with scotoma for red and green above fixation point. FITZGERALD.

At a meeting of the Glasgow Pathological and Clinical Society, Drs. FRASER and GAIRDNER (14) exhibited two interesting cases of aphasia. Both the patients had to some extent become re-educated. An ophthalmoscopic examination had been made by Dr. Meighan. In the first case, the optic disc of the left eye was pale, with a small spot of pigment at the upper and outer side; the veins were dilated and tortuous, and the arteries small and contracted. The right eye was normal. In the second case, the discs were normal, but the vessels in the left eye were dilated and more numerous than in the right. *British Medical Journal*, May 13, 1882. FITZGERALD.

At a meeting of the Southeastern Branch of the British Medical Association, Dr. HUGHLINGS-JACKSON (17) showed a drawing of visual projections made by a patient subject to attacks of migraine. J. thinks that in these cases there is a discharge of nervous elements in some convolutions, probably in Ferrier's visual centre. FITZGERALD.

A case reported by LAWSON (19), which was under observation for about one year. When first seen by L., about eight months after the first observations had been recorded, he found the distant vision of both eyes normal, considerable loss of accommodation, and well-marked optic neuritis in the right eye. At post-mortem examination a tumor, somewhat ovoid in shape, 2½ inches in length, 2 inches in width, and 1½ inches from above downward, was found, occupying a large portion of the anterior third of the right hemisphere.

FITZGERALD.

A. MATHIEU (22) describes a tumor the size of a hen's egg at the external and posterior part of the right cerebral peduncle, occupying the outer layers and extending into the distended lateral ventricle, and the floor of the fourth ventricle; the eminentia teres decidedly thickened. In view of the left-sided paralysis of the oculomotor nerve which formerly had existed, the author infers total crossing of the nerve fibres at their central termination. v. MITTELSTÄDT.

MILLS (23) reports twelve cases of cerebral tumors, in eight of which ophthalmoscopic data were obtained, and in four microscopical examinations made. In four there was choked disc, and in the same number, descending neuritis. Both eyes were always affected. The autopsy showed that the choked disc was always associated with a cerebral tumor of the convexity, while in the case of descending neuritis the tumors were situated at the base of the brain, being generally tumors of the cerebellum combined with hydrocephalus. The author ascribes the cause of choked disc to the filling of the inter-vaginal lymph-spaces of the optic nerve, whereas he regards descending neuritis as the result of direct propagation of the inflammation to the optic nerve. BURNETT.

POWELL (33). Boy of thirteen, previously in good health, affected suddenly with severe pain in right frontal region; rigors, some vomiting, and, three days later, paralysis of third nerve (apparently of all branches). Some elevation of temperature. No papillitis; physical signs of chronic pulmonary disease. P. by exclusion, diagnosed localized tubercular inflammation involving the intracranial part of the third nerve. Believing mercury to be useful, or at least admissible, in early stages of local tubercular processes, P. gave small doses with iodide. Three weeks after onset, third nerve had quite recovered and temperature normal. NETTLESHIP.

SAUNDBY (39). Woman liable since the age of twelve to attacks of sickness, drowsiness, pain in left temple, and ptosis; lasting some days and recurring every few months. S. witnessed two attacks, and found, besides ptosis, complete paralysis of the third-nerve muscles, extrinsic and intrinsic (and partial paralysis of dilatator pupillæ ?). The muscles recovered perfectly, except the superior rectus, which remained quite paralyzed, and lev. palb. which only partly recovered. No other neural symptoms. Reference to literature. Case reported carefully in detail. NETTLESHIP.

STRÜMPELL (42) reports a case of brain-tumor in an otherwise healthy woman, which caused death in the course of a year. Paresis of the left side of the body, left-sided deafness, amaurosis and choked disc in both eyes. The post-mortem showed a glioma of the middle portion of the posterior central convolution, which had reached the surface in the parietal line.

WAREN-TAY (45). CASE 1.—Man, twenty-one. Fall on the head; probable fracture of the base of the skull; slight concussion symptoms, with bleeding from the left ear; deafness, slight ptosis and weakness of internal rectus on the same side; pain in the head; development of double neuro-retinitis, increasing, then subsiding; vision unaffected; recovery from the slight paralysis, the deafness persisting.

CASE 2.—Man, twenty-seven. Fall on the head; concussion; pain in the head; optic neuritis (double) noted on twentieth day; increasing for a week, then subsiding; vision unaffected; patient hypermetropic. FITZGERALD.

BOLIS (4) observed in twelve out of twenty cases of tabes ocular affections. In eight of them there was myosis in either one or both eyes, in three there was, besides, atrophy of the optic nerve; in one, paralysis of the levator palpebræ; in three others, paralysis of muscles. Stretching the nerve, which had been done for paralysis in other parts of the body with some success, did not produce any change in the ocular symptoms. DANTONE.

DOWSE (10), in a paper, on the differential diagnosis of intracranial disease, general paralysis of the insane, and tabes dorsalis, states that he has verified the assertion of Graefe, that patients who are suffering from diplopia in tabes dorsalis, show slight tendency to the blending of images in binocular vision; but in D's opinion, the reverse often occurs in the vision of the general paralytic. He is also inclined to believe from some cases which he has had under observation, that those cases of ataxy which are preceded by sclerosal changes in the optic nerve are frequently cases of abortive general paralysis, and which are decidedly cerebro-spinal rather than purely spinal. FITZGERALD.

PONCET (32) found complete fatty degeneration of the intraorbital as well

as intracranial, portion of the optic nerve, of an ataxic person; also hypertrophy of the septa. The nerve-fibre and ganglionic layers of the retina were intact. Amaurosis in tabes is due to central structural changes; in this case it had existed for ten years. v. MITTELSTÄDT.

In regard to progressive paralysis, FERÉ (13) found that in one case it was preceded in the course of one and a half years by five typical attacks of amaurosis partialis fugax. There was right-sided hemianopsia, combined with temporary aphasia and paralysis of the right arm. In later attacks there were also epileptiform convulsions. Caution should therefore be exercised in making a prognosis (though favorable in the great majority of cases).
v. MITTELSTÄDT.

STENGER (41) reports in regard to the cerebral disturbances of paralytics: 1, on soul-blindness and cortex-amaurosis with the result of five autopsies; 2, on hemianopsia based on three autopsies; 3, on visual hallucinations.

In opposition to Gray, who maintains that the pupil of epileptics is more or less dilated in the interval between attacks, PIERRE (31) could not verify this observation, based on fifty-three cases, nor the statement of the same author that contraction here takes place much more quickly.

NIEDEN (28) observed a case of recurrent herpes zoster ophthalmicus, no case like which has as yet been reported; five well-marked attacks were observed in the course of six years, with all the symptoms characteristic of herpes ophthalmicus. The case was one of severe injury of the upper part of the spinal column, leaving curvature and periosteal thickening, and probably giving rise to a secondary affection of the upper cervical sympathetic ganglion which produced the attacks.

RAMPOLDI (36) observed a bilateral case of Graves' disease, in which exophthalmus did not develop until fifteen years after the swelling of the thyroid gland (on the left the size of a hen's egg), on the right of the head of a fœtus. Marked bruit over the heart and arch of the aorta. Graefe's lid-symptom could only be detected when the patient rapidly looked downward. Vision normal, no arterial pulse in the fundus. The degree of exophthalmus is not given, but the lids could be closed. Rampoldi notes as a peculiarity a large number of pityriasis-spots upon the breast of this patient, as also of another, which extended to the abdomen. DANTONE.

NETTLESHIP (27). Retinitis, with white patches, in both eyes of a man suffering from diabetes. Cholesterine in vitreous of right eye, probably of two years' duration. Embolism (thrombosis ?) of retinal artery in left. History of "diabetes" in early life. Death from gangrene of foot. FITZGERALD.

After discussing the general toxicological effects of alcohol and nicotine, PETRUCCO (30) describes three cases of parenchymatous and interstitial atrophy of the optic nerve observed by himself, which he would ascribe to the two substances mentioned, though all general symptoms might be wanting.
DANTONE.

In a case of ULRICH (44) the visual disturbances were due to eating rotting ham. The symptoms were impaired digestion, a scratching sensation in the throat, paralysis of accommodation and of the sphincter papillæ. Two members of the family suffered from the two last affections for some time.

SZILI (43) observed a case of blindness four days after a normal delivery, without any other symptoms or ophthalmoscopic changes. Patient was completely cured by confinement in a dark room. Perhaps it may be considered a case of blinding, the retina being highly hyperæsthetic.

SAUNDBY and EALES (38). The authors undertook a series of observations with the view of determining the frequency with which changes, more especially optic neuritis and the like, may be found in chronic anæmia or chlorosis, as seen in young women. In a series of fifty cases of chlorosis, sixteen presented some abnormal appearance of the fundus, and while allowing that in the greatest number the changes were indecisive and of little moment; in five, or, in other words, 10 % of the whole number, they were unequivocal, while in 8 % there was evidence of some degree of neuro-retinitis. Though, as a rule, V was normal in these cases, yet in several, in which the pupil was fully dilated by atropine, a perforated disc held before the eye actually depreciated it. This seemed to indicate a failure of light-perception, and S. and E. suggest that possibly this failure of light-perception may be the factor in the production of the dilated pupil, so general in chlorotic girls. In a series of eleven cases of secondary anæmia, the result of hemorrhage-changes of some sort were found in five, though definite changes were found in only two. FITZGERALD.

BEHRING and WICHERKIEWICZ (3) describe a very rare case of metastatic chlorosarcoma, which was first noticed in the orbit of the right eye of an otherwise healthy young man of twenty-eight, caused exophthalmus, and was accompanied by choked disc of both eyes. Metastatic proliferation went on very rapidly, while vision diminished proportionately. The ophthalmoscope revealed, besides the characteristic symptoms of optic neuritis, peculiar dark striated thickenings of the retinal blood-vessels, whose origin was first ascribed to rupture, but proved to be neoplastic infiltrations of the walls of the blood-vessels. Two months later death ensued, after the patient had become completely blind and severe cerebral symptoms had developed. The tissue of the neoplasm was found to consist almost entirely of round cells, somewhat larger than white blood-corpuscles, with large nuclei staining intensely; besides these there were short spindle-shaped elements with similar nuclei, filled with numerous fat-granules. The cause of the bright green color which the sections of all these tumors presented could not be determined either by microscopic or microchemical examination. The high percentage of chlorine in all parts of the tumors was very remarkable, and their green color may be fairly brought into connection with this. The tumor probably had originated in the sphenoid cavity, and had then proliferated into the nasal and orbital cavities and into the right medial cerebral fossa.

MULES (25). Man of fifty-nine. All the arteries were converted into shining white lines, and there were numerous retinal hemorrhages. The other eye was normal in every respect. Appended are abstracts of previously published cases, and a colored plate. Ten months later the other eye was affected by albuminuric changes, but without any periarteritis. FITZGERALD.

CARRERAS, ARRAGÓ (5) mainly offers some therapeutical remarks on ocular affections in measles. He observed a case of meningitis with optic neuritis after measles, and another of anæmia of the retina, with reduction of vision to $\frac{1}{10}$.

MACKUNA (21) considers that the cornea in small-pox becomes more frequently affected during the stage of scabbing, from the twelfth to the fourteenth day of the eruption, when the patient is getting over the secondary fever, and is associated with the formation of furunculous abscesses in other parts of the body in severe confluent cases. Constitutional treatment is of the utmost importance in these cases. Locally he applies lint soaked in a lotion of belladonna with sulphate of copper and tepid water. In the case of children and some persons who find it hard to keep their eyes at rest, and also to prevent scratching, M. speaks in favor of Cellini's eye-protectors. These are zinc plates made of the same size as the eyelids and fixed by means of an elastic band. FITZGERALD.

According to CORNILLON (6), hemeralopia occurs in all kinds of affections of the liver, and probably is due to the icterus accompanying them. He reports three cases of simple hypertrophy of the liver, and of cirrhosis in the hypertrophic and atrophic stage. In each, hemeralopia was at first but temporary, but later became persistent; once improvement after a diet of raw ox-liver (?). An ophthalmoscopic examination was only made in the first case, when a high degree of venous hyperæmia and arterial anæmia combined with peripapillary œdema was observed. V and color-perception normal in good illumination.
V. MITTELSTÄDT.

CRITCHETT (9). Woman of twenty-three. History of acquired syphilis, the first symptoms of which were noticed four months before. Condylomata and roseolous rash. Left eye, V — $\frac{6}{9}$ and J. 1. Fundus normal. Right eye, V — J. 16. Well-marked optic neuritis with retinal haze. FITZGERALD.

ADAMS (2). Case 1.—Girl of thirteen. Rheumatic history. Symptoms of endocarditis, with panophthalmitis of both eyes, followed by gangrene of legs. Death. Aortic valves covered with masses of soft vegetations; embolic changes in spleen and right kidney. Vitreous in each eye in state of suppuration. Microscopic examination of optic nerves failed to show any plugging of arteries, or the presence of micrococci or bacteria.

Case 2.—Boy of fifteen. History of acute rheumatism and disease of mitral valves. Acute attack of endocarditis with pyrexia. Panophthalmitis of one, and a week later of the other, eye. Death. No post-mortem. A. suggests that these cases may have been septicæmia and not rheumatism. FITZGERALD.

CORNWELL (7) made the same diagnosis in a woman suffering from erysipelas of the right side of the face, which was followed by injection of the right eye, hypopyon and diminution of vision, and intraocular pressure. Although the inflammation subsided, sight continually diminished until three weeks later death ensued. Probably there was septic embolism.

NETTLESHIP (26). Man of forty-eight. Right eye had no p. l.; disc very pale, and vessels small. Eye had been perfect until a month before, when severe erysipelas of side of face and head came on. The upper lid "broke," and a slough came out, and when the swelling of lids had subsided so as to allow the eye to be opened, it was found to be blind. FITZGERALD.

EDMUNDS (12). Man of thirty-two. Ligature of left common carotid for wound of throat. Four or five days afterward left eye was noticed to be affected, and on tenth day after ligature there was well-marked panophthalmitis. Right hemiplegia came on, and patient died twenty-five days after ligature.

Post-mortem examination: three abscesses in left side of brain, and basal meningitis. Left eye: whole of vitreous converted into pus; much inflammatory material in nerve-sheath, extending slightly into substance of nerve along trabeculæ. Retina swollen; choroid inflamed. References to three other cases. FITZGERALD.

The conclusion of the report for 1882 will appear in the next number.

MISCELLANEOUS NOTES.

The fifth international Congress for Hygiene, which meets at the Hague in 1884, will award a prize of 2,000 francs for the best essay "On the causes of blindness and practical measures to prevent it."

PROGRAMME.

1. *Causes of blindness:* (*a*) Influence of heredity; (*b*) eye-diseases of childhood; (*c*) school-life and apprenticeship, progressive myopia; (*d*) general diseases, diatheses, fevers, intoxication; (*e*) influence of trade, accidents, injuries, sympathetic ophthalmia; (*f*) social and climatic influences, contagion, unhealthy dwelling-places; (*g*) improper or neglected treatment of eye-diseases.

2. *Point out the appropriate means of prevention for each group of causes:* (*a*) legislative; (*b*) hygienic and professional; (*c*) pedagogic, medical, and philanthropic measures.

The prize of 2,000 francs will be awarded for the best unprinted essay written in English, German, French, or Italian, by the *Society for the Prevention of Blindness* in London, and conditionally a second prize of 1,000 francs, or two of 500 francs each, and a medal with a diploma by the *Société internationale pour l' amélioration du sort des aveugles.* The manuscripts with a motto, and without mention of the author, but acccompanied with a sealed envelope containing the same motto and the name of the author, have to be in the hands of the secretary, Dr. G. Haltenhoff, Geneva, Switzerland.

We take pleasure in noticing the appearance of the following works:

1. J. R. WOLFE, M.D., of Glasgow: On Diseases and Injuries of the Eye. Philadelphia: P. Blackiston, 1882; $7. The author, well known by his original method of transplantation of flaps without pedicles, and of rabbit's skin to the human conjunctiva, publishes in a text-book of 452 pages, a course of systematic and

clinical lectures to students and medical practitioners. Ten colored plates with twenty small ophthalmoscopic figures, half well, half (for instance the four on optic neuritis) very poorly executed from drawings of Dr. Magnus of Breslau, are embodied in the volume. The book is clearly and attractively written and will be read with pleasure and profit, not only by the student and practitioner, but also by the ophthalmic specialist.

2. W. R. GOWERS, M.D.: A Manual and Atlas of Medical Ophthalmoscopy; 2d edition, 1882; P. Blackiston, Philadelphia; $6; 384 pages; many original plates. This book is exceedingly valuable, both to the general practitioner and the oculist, for the many original observations it contains.

3. C. S. FENNER: Vision and its Defects; 2d edition, revised by the author before his death; P. Blackiston, Son, & Co., Philadelphia, 1883. This elementary treatise on refraction and accommodation, with an introduction on optics and seventy-four woodcuts, may be recommended to the beginner.

4. New editions appeared last year of the popular text-books of Magnamara, Nettleship, and Mittendorf.

5. Though not a work on ophthalmology, the Text-Book of Pathological Anatomy and Pathogenesis, by Prof. E. Ziegler, of Tübingen, translated and edited for English students by D. Macallister, Cambridge, can be highly recommended. Part I—General Pathological Anatomy,—the only one out thus far, is a concise and excellent exposition of pathology, in which the chapter on parasites (bacteria, etc.) will be particularly welcome.

Fig.1.

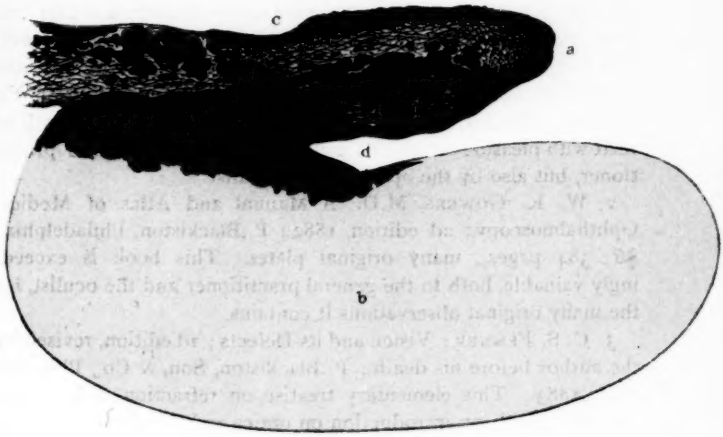
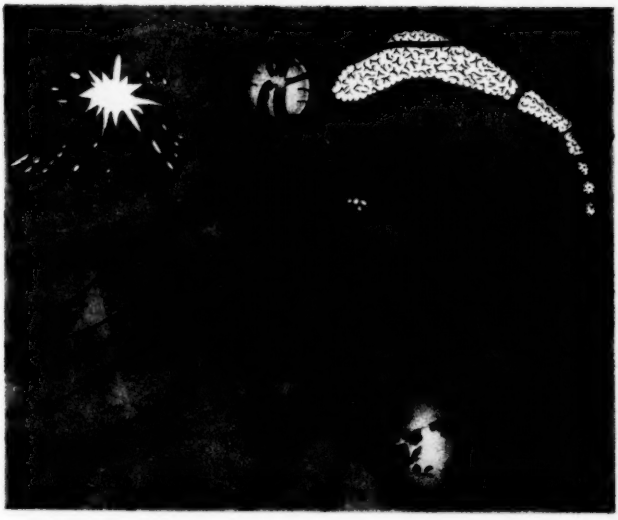


Fig.2.



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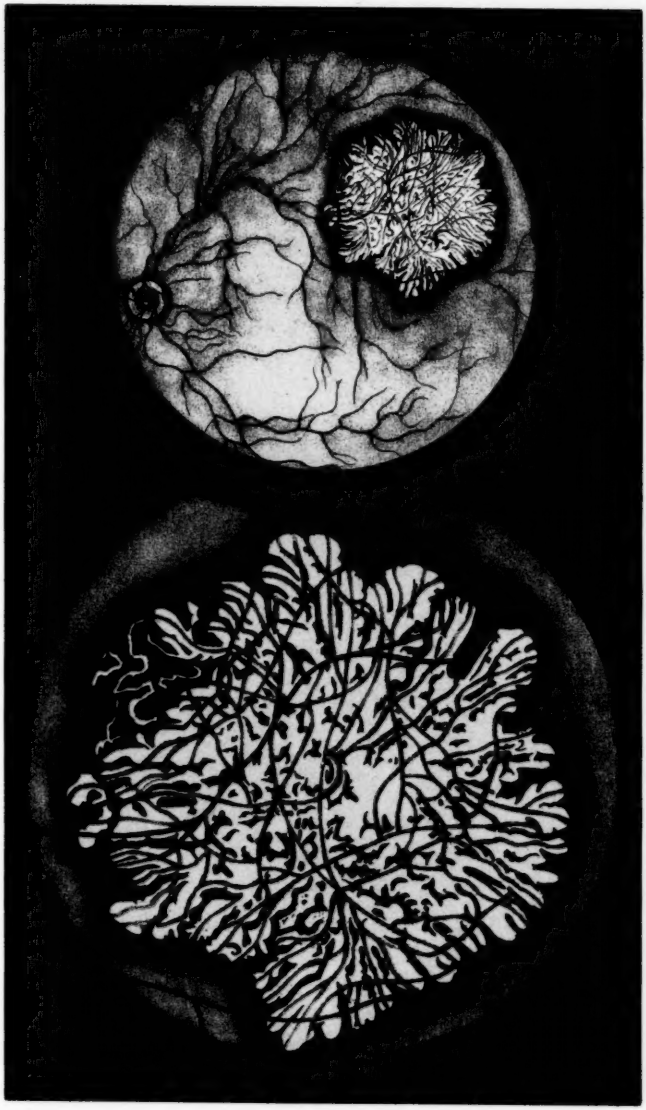

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